THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIX. No. 735.] LONDON, JUNE 12, 1877. [29TH YEAR.] Price 6d.

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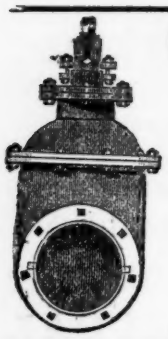

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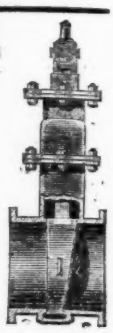

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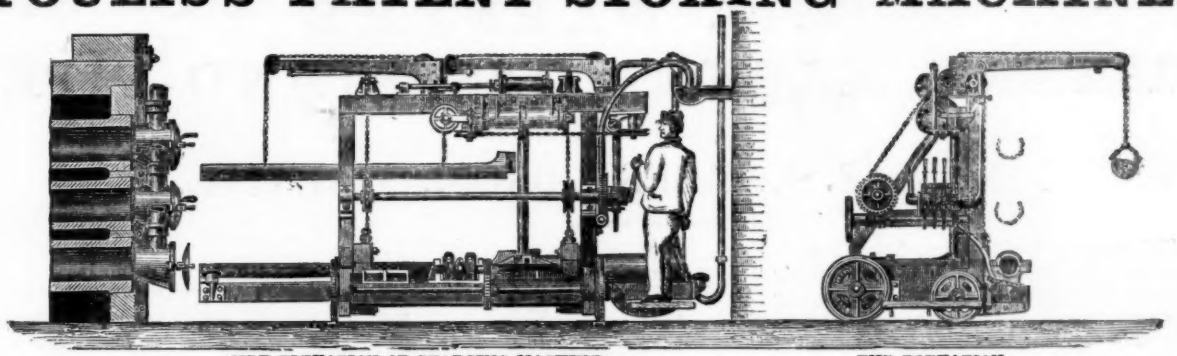

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(*The Drawing Machine will be Illustrated in next week's Advertisement.*)

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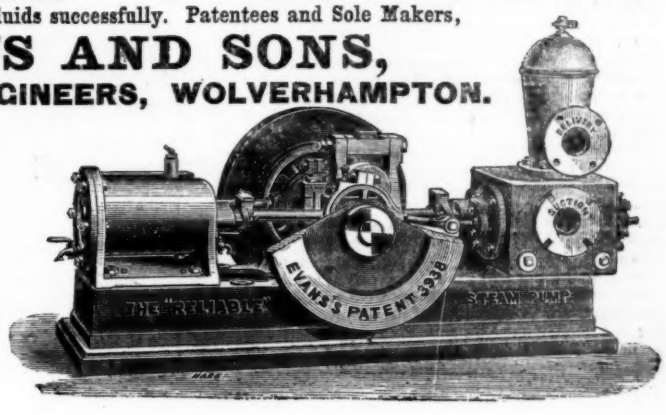

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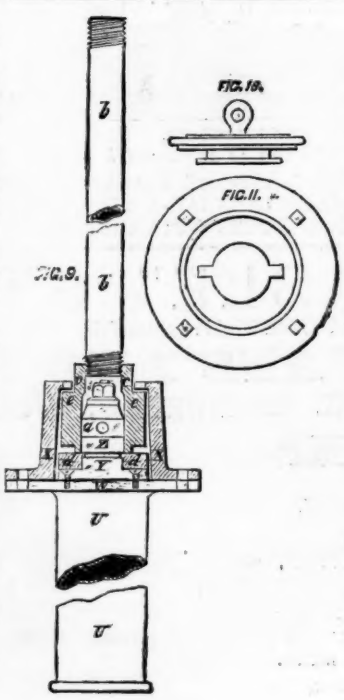

Fig. 9 represents the arrangement for the attachment of removable market or other gas stand-pipes. The view is a side elevation and part section. To the top of the service, U, is fixed a plate, W, and upon that is fastened by bolts the case or box, X. To the plate, W, is also fixed, by screws, the plug or valve, Y, and upon this plug the barrel Z is free to turn. That part of the barrel marked *a* is square. The stand-pipe, *b*, has attached to its lower end the collar, *c*, which is square in the interior, so as to slip over and turn the barrel by the square part, *a*, until the hole in the plug and that in the barrel coincide, when a gas-way will be established between the service, U, and the stand-pipe, *b*. A gas-tight joint between the collar, *c*, and the plate of the plug or valve, Y, is made by the former being forced down upon an india-rubber washer, *d*, by the upper part of the feathers, *e*, of the collar, *c*, coming in contact with inclined projections cast on the inner side of the box, X.

Fig. 10 is a plan of the top of the box or case containing the valve.

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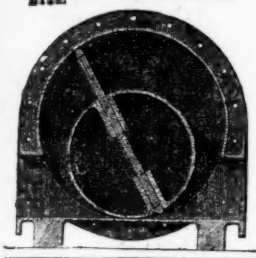

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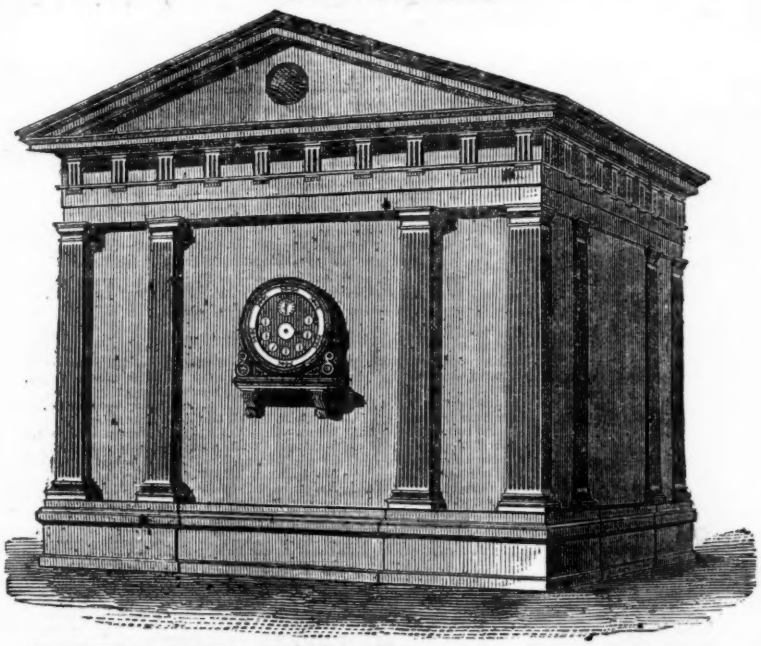

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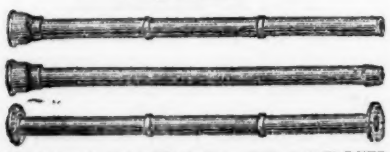
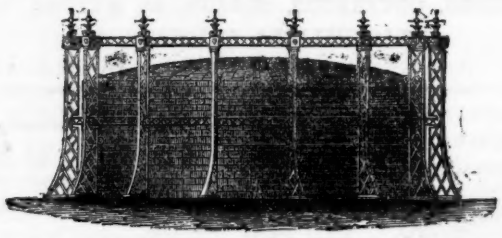
SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;
GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;
And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.
J. C. SELLARS,
THE GAS CEMENT WORKS,
BIRKENHEAD.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
23 & 25, OSWALD STREET, GLASGOW.
CAST-IRON GAS AND WATER PIPES.



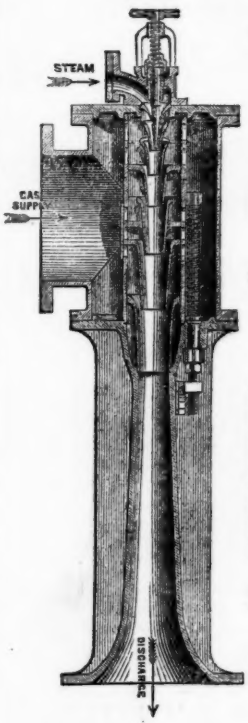
DELIVERY F.O.B., GLASGOW.
Prices on application.

ALFRED WILLIAMS,
PHŒNIX FIRE-BRICK WHARF,
64, BANKSIDE, SOUTHWARK, LONDON, S.E.
GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.



THE HORSELEY COMPANY,
LIMITED,
TIPTON, STAFFORDSHIRE.
LONDON OFFICE:
6, WESTMINSTER CHAMBERS, VICTORIA STREET,
GAS ENGINEERS, IRONFOUNDERS, &c.,
MANUFACTURERS OF
GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,
AND ALL REQUISITES FOR EITHER
GAS OR WATER WORKS;
ALSO
MAKERS OF ROOFS, BRIDGES, &c.

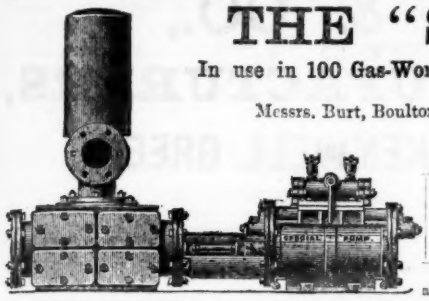
KÖRTING BROS.,
Steam-Jet Engineers,
7 and 17, LANCASTER AVENUE,
MANCHESTER,
AND 40, LOWER GARDINER STREET, DUBLIN.



E. KÖRTING'S PATENT
STEAM-JET GAS-EXHAUSTER.
IMPROVED CLELAND'S PATENT.
Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—No Steam-Engine—No Attention—No Extra Room Required—No Wear and Tear—No Noise—No Oscillation in Vacuum, or Back Pressure.
UPWARDS OF 200 IN USE.
SUPPLIED TO—

Chartered Gas Co.	Glasgow Corporation.	Hanna, Donald, and Wilson, London.
London Gas Co.	Leyland Gas Co.	Ratcliff Gas-Works.
S. Metropolitan Gas Co.	Stalybridge Gas-Works.	Kendal Gas-Works.
Phœnix Gas Co.	Lincoln Gas-Works.	Longton Gas Co.
Liverpool Gas Co.	Birmingham Gas-Works.	Dartford Gas Co.
Bolton Corporation.	Wakefield Gas-Works.	Exeter Gas Co.
Horsham Gas Co.	Brentford Gas-Works.	Harrogate Gas Co.
Epsom and Ewell Gas Co.	Burnley Gas-Works.	Hertford Gas Co.
Ipswich Gas Co.	Guildford Gas-Works.	Waterside Gas-Works, Todmorden.
Cheltenham Gas Co.	Gloucester Gas-Works.	F. W. Grafton and Co., Accrington.
Sandwich Gas Co.	Kirkintilloch Gas-Wks.	
Cornholme Dis. Gas-Wks.	Nantwich Gas-Works.	
Bury Gas-Works.	Enniskillen Gas-Works.	
	&c., &c., &c.	

E. KÖRTING'S PATENT STEAM-JET REVIVIFYING BLOWERS FOR THE PURIFYING MATERIAL.
SOLE LICENSEES FOR
W. CLELAND'S PATENT STEAM SCRUBBER AND SLOW-SPEED CONDENSER.
FOR PARTICULARS, APPLY TO
KÖRTING BROS., 7 and 17, Lancaster Avenue,
MANCHESTER,
and 40, Lower Gardiner Street, Dublin,
OR TO
GERALD J. TUPP, 8, John Street, Adelphi, W.C.,
LONDON,
SOLE AGENT FOR ENGLAND AND WALES.



THE "SPECIAL" STEAM-PUMP.

In use in 100 Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

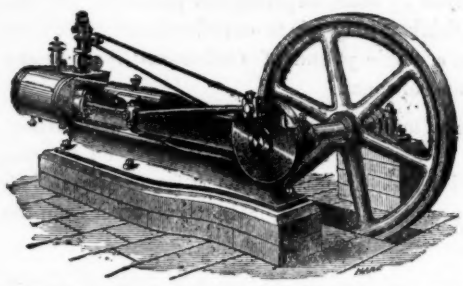
Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have Forty "Special" Steam-Pumps in use at their several large Tar-Works.

200 Sizes made. The following are the Leading Sizes for Gas-Works:—

Steam Cylinder . . .in.	3	4	3	5*	5*	4	6*	5	7*	6	8*	7	10*
Water Cylinder . . .in.	1½	2	3	2¼	3	4	4	5	5	6	6	7	7
Gallons per hour . . .	450	815	1830	1250	1830	3250	3250	5070	5070	7330	7330	9750	9750
Price	£16	£18	£18	£21	£22½	£25	£30	£32½	£40	£40	£50	£50	£65

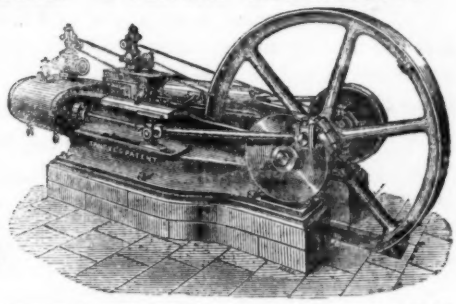
* These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.

TANGYE'S HORIZONTAL HIGH-PRESSURE STEAM-ENGINES.

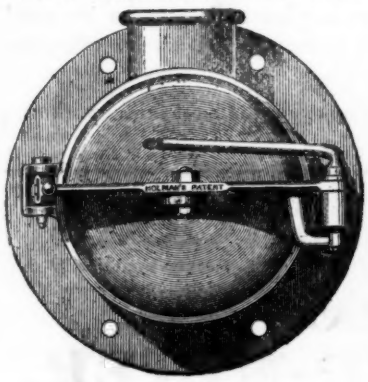


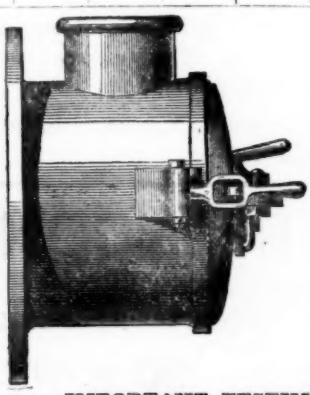
THE DESIGN,
WORKMANSHIP,
AND
LOW PRICE
OF THESE ENGINES
HAVE CALLED FORTH
UNIVERSAL APPROVAL.

Over 2000 Sold
Since December, 1869.



SIZE	B	C	D	E	G	H	I	J	K	M
Nominal Horse Power	TWO	THREE	FOUR	SIX	EIGHT	TEN	TWELVE	FOURTEEN	EIGHTEEN	TWENTY-FIVE
Price of Engine, with Governor	£38 0	£38 0	£46 0	£70 0	£90 0	£115 0	£127 0	£140 0	£195 0	£220 0
Feed-Pump, extra	3 0	3 15	4 0	5 10	6 0	7 10	7 10	8 0	10 0	15 0
Variable Expansion Gear, extra	..	..	..	..	13 0	14 0	15 0	15 0	20 0	25 0





MORTON'S
Patent Self-Sealing
RETORT LIDS,

WITH

HOLMAN'S NEW PATENT BRACKETED CROSS-BARS, ANTI-FRICTION CATCHES, AND ECCENTRIC FASTENINGS.

Instantaneous Sealing effected. No Luting. No Duplicate Lids required. Holman's New Self-Sustaining Cross-Bar ensures freedom of joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested (rigid cast iron is now successfully employed), nearly 25,000 being in use at various Gas-Works in London and the Provinces.

IMPORTANT TESTIMONIAL.

The Gaslight and Coke Company (commonly called the Chartered Gas Company), Beckton, North Woolwich.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them. I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly, (Signed) G. C. Trewby.

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dronfield, Dursley, Exeter, Guernsey, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

Messrs. Tangye Brothers and Holman.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) John Johnson.

PRICES AND FULL PARTICULARS ON APPLICATION TO

TANGYE BROTHERS & HOLMAN,

SOLE MANUFACTURERS,

LAURENCE POUNTNEY LANE, LONDON, E.C.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

TO GAS ENGINEERS AND MANAGERS.

It having come to our knowledge that a report is in circulation, spread by some unprincipled person or persons, that the cases of our larger-sized Meters are made of Galvanized Iron, we think it only fair to ourselves, and just to our customers, to say, that we never have used, in making any of our Meters, a single pound of *Galvanized Iron*, or any other *cheap* and *inferior material*, and this can be easily seen by opening any of them.

The cases of our large-sized Meters, from 20 lights and upwards, are all made of the very *Best Best Patent Alloy*, which is nearly double the price, and will last more than double the time, of some other material that has been and still is very largely used for the same purpose. And our experience, acquired by an extensive use of it for upwards of 30 years, enables us to say with confidence that no other metal in use for the purpose is so little liable to corrosion from the action of the gas.

We have now in use a Meter made in 1848, and therefore 29 years old, the case of which is made of Patent Alloy; the Meter is still in perfect order, and shows no signs of decay.

The utmost care is exercised by us in selecting none but the very best materials for all parts of our Meters; much of it is made *expressly for us*, as it is not possible to obtain it in the open market of the same superior quality.

The great fall in the price of all materials used in making our Meters has enabled us to give an increased discount, thus giving our customers the benefit of the fall. This we were bound in fairness to do, as we raised the price of our Meters four years ago, when the price of all metals went up.

It will be our constant endeavour, by using none but the best materials, and employing the most skilful workmen, to maintain the high character our Meter has hitherto borne.

WILLIAM PARKINSON & CO.

(ESTABLISHED 1816)

ARE THE ONLY MAKERS

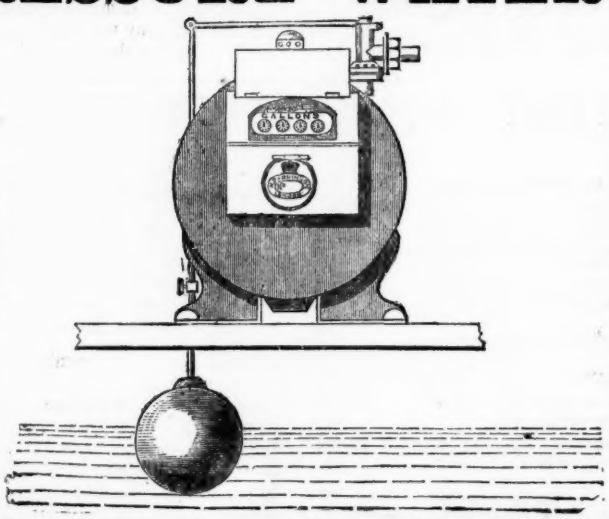
OF THE

LOW-PRESSURE WATER-METER.

These Meters will register with perfect accuracy, either at full speed, or with a few drops only passing through them.

They must be placed over the cistern to be supplied, and the water, after being measured, will fall from the outlet into the cistern below. Each Meter is fitted with a ball-valve, so made that it can be adjusted to shut off the supply at the inlet when the water reaches any required height in the cistern.

The 100-gallon Meter is fitted with a cistern holding about three or four gallons, and may be fixed inside a house, free from the effects of frost, and requires no attention after once being fixed.



From "The Engineer," April 6, 1877.

"Low-pressure Meters have been found to register with almost perfect accuracy, or, at all events, within 5 per cent. either for or against the consumer, and from the nature of their construction are by no means easily deranged. Still, even the low-pressure meters have their disadvantages, but these are chiefly as respects the question of first cost, seeing that they must have a cistern fixed at a higher level than that at which the supply is needed. All things considered, however, the balance of opinion rules at present in favour of the low-pressure Meter, and they are consequently increasing in favour as time goes on."

These Meters have been manufactured by W. P. & Co. for more than 25 years, and are largely used by the following and other Water Companies:—

NOTTINGHAM, DERBY, LEICESTER, SUNDERLAND, GREAT YARMOUTH, SHEFFIELD, NORWICH, LOWESTOFT, COVENTRY, SOUTHEND.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 12, 1877.

Circular to Gas Companies.

THE verdict has been given by the Select Committee of the House of Commons, who considered the Bill promoted by The Gaslight and Coke Company, and we regret to say it was entirely adverse to the proposal of the Company. The Committee simply declared the preamble of the Bill not proved, and thus did not, as the Chairman led us to expect they would, suggest any alternative arrangement. Thus the Company are thrown back upon the Referees, who are fully empowered to take into consideration the evidence given in favour of the Company's Bill. With the facts and opinions detailed in the course of this inquiry before them, we have little doubt that the Referees will see their way to make some relaxation, and to such an extent, perhaps, at some of the manufacturing stations of the Chartered Company, as will allow the use of lime to be dispensed with. It must, however, be confessed that we are somewhat in the dark as to the amount of "sulphur" which ordinary London gas contains when purified by oxide of iron and scrubbing with liquor alone. It seemed to be assumed rather than proved that, under such circumstances, not more than thirty-five or forty grains of sulphur are present; and it will be remembered that this latter quantity was the amount proposed by Mr. Baxter, on the part of the Companies, when the Bill of 1860 was under consideration. But we cannot help thinking that a much larger proportion is present, and it would be of little use to fix a maximum of thirty-five grains, as was proposed, if the amount was liable to run up occasionally to sixty or seventy grains.

The decision of the Committee, however, leaves matters exactly as they stood, and the Referees in full power. It is to them, therefore, we have to look for relief to the Company, if possible, and, we are bound to add, protection to the public. These latter, it would appear, are doomed to suffer inevitably. They must either be "poisoned" (to use the figurative expression employed on both sides) by the emanations from foul lime, when purifiers are discharged at the gas-works, or they must submit to a slower—a very slow process of extinction by "sulphur," witnessing all the while a dismal change in their wares and household goods. Now, the only way of avoiding this double catastrophe is to discover some means of purifying gas from sulphur, which, while accomplishing its object, would involve no offence. The strongest objection against the Chartered Company's Bill that occurred to us was, that its success might have —we are far from saying that it would have—led the Company to relax their efforts towards perfect purification. The complete abrogation of a law sets people free to do as they like. If there were no commandment, "Thou shalt do no murder," with a hangman to avenge its infraction, we believe that homicide would be a much more frequent occurrence. There is not, it is true, any reason why the Chartered Company, any more than ninety-nine out of every hundred Gas Companies, should be subject to restrictions in respect of sulphur. On the contrary, they were fairly entitled to the immunity granted to other Gas Companies, and nearly every Corporation possessing gas works. The Committee, however, have decided that the Company shall continue subject to such restrictions as the Referees may impose, and it is to these, as we have said, that we have now to appeal. There remains also that resort to the Court of Chancery threatened by the complaining Local Authorities, which would compel the Referees to justify their Instructions and requirements. Now, we have, of course, no word to say against any one of these gentlemen. Mr. Vernon Harcourt, who was a most candid and exemplary witness, admitted that the difference between twenty-five and thirty-five grains of sulphur in a hundred cubic feet of gas was a matter of no consequence. But it is the removal of the difference (ten grains) which causes the alleged nuisance, and puts the Gas Company to a very large expense. We have hinted above that the total amount of sulphur in gas is unknown, but we know very well, by comparative tests, how much lime removes, and the difference must be regarded as immaterial. It being granted that only thirty-five or forty grains are present when lime is not used, and that we cannot confidently rely on the steady and continuous removal of more than ten of these grains by the use of lime, then it would seem absurd to occasion a nuisance for so small a result. It may be that the Committee saw the matter in this light, and, by rejecting the Bill, simply left the question to be dealt with by the Referees, as provided by the Act of 1868 and subsequent enactments. We must leave the matter here for this week, expecting that, before our next publication, we shall know something of the intentions of the complaining Local Authorities.

We may mention here that a rumour was current in the committee-room that a process had been quite recently devised, by the aid of which the *whole* of the "sulphur" in gas could be easily, cheaply, and inoffensively removed. Of course it was a secret until it was patented, which was to be done immediately. We give the story for what it is worth, but we must say that we shall greatly rejoice if any inventor can show us a way out of our present difficulties.

On last Tuesday evening a number of gentlemen, provided with tickets, went to the West India Docks, to witness experiments with M. Jablochkoff's "electric candles." Those who attended early were gratified with a short display; but, before we arrived, the steam-engine which drove the magneto-electric machine had broken down. Another was brought, but some accident happened to that; and, by-and-by, the last train to the City was announced, and a general stampede of the disappointed visitors took place. In relating these facts, it must be clearly stated that we insinuate no doubt as to the success, such as it is, of M. Jablochkoff's invention. We merely mention them to show one of the accidents to which this system of illumination is liable. Three weeks, we were told, had been spent in preparing for this experiment, with the result stated. It has happened that a town has been thrown into darkness by an accident at a gas-works, but such an accident has been of extremely rare occurrence. Without stopping now to describe the arrangements

made for the display at the West India Docks, which we shall have the opportunity of doing when the exhibition comes off, we may here quote some remarks on the Paris experiments, made in the contemporary we referred to last week—*Le Journal des Usines à Gaz*—of which we shall shortly give a full translation. Our contemporary admits, as we do, that the invention is, to a certain extent, a valuable one, and points out that the discovery of the divisibility of the electric current is not due to M. Jablochkoff, but belongs to our countryman—Mr. King—who patented an invention in November, 1845. We have not yet had the opportunity of referring to Mr. King's patent, so cannot say exactly what he claimed. But we find it stated in the journal we quote from that the invention was quite forgotten, until M. Lodugvine, a Russian physicist, invented a small lamp on the same principle, which was perfected by two other Russian inventors. Then came the invention to which we now refer. The illumination of the Salle Marengo is, we are told, effected by eight electric candles, supplied by two of the electro-magnetic machines of the Alliance Company, each driven by a six-horse power steam-engine. The illumination by gas is effected by eleven gaseliers, having, in all, seventy-four burners. To cut the story short for the present, we may mention that our contemporary calculates that the cost of the electric light is just about four times that of the gas light. We pass on to the reasons given for supposing that the electric light will never supersede gas in a drapery establishment like that of the Magasin du Louvre. It is pointed out that where gas is used, it is lighted as twilight comes on, and the illumination is increased as darkness increases. Shutting-up time arrives, but some light is still wanted that the shopmen may see to clear up. Half the burners are turned out, and the consumption of the others is reduced. Presently the cashiers only remain, who require but one or two burners to enable them to see to make up their accounts. But if the electric candle were employed, the six-horse engines must have been working away all the time, to supply electricity to even one candle. As a matter of fact, it has not been found possible to dispense with the use of gas during these experiments at the Salle Marengo. M. Jablochkoff's carbons will only last for from half to three-quarters of an hour, and when it is necessary to replace them in one candle, we believe that all the others are extinguished—that is, all the others supplied by the same machine. It is easy to see that a system subject to such derangements, however ingenious, can never take its place as a practical mode of illumination. Further, we will only quote that the entire Magasin du Louvre is lighted by 3000 burners, and if, to replace 100 of these, two machines and two six-horse engines are required, it follows that, to entirely substitute electric candles for gas, would necessitate the employment of sixty magneto-electric machines, and a motive force equal to three hundred and sixty horses. Our contemporary adds, that the siliceous fumes given off, in consequence of the volatilization of the "kaolin" around the carbons, irritate the air passages, and that ladies do not like the light, for the reason that it gives their faces a pale, cadaverous look.

We have mentioned before, that the present modes of estimating the value of ammoniacal liquors are not reliable, and may be very much to the disadvantage of the liquor seller. Twaddel's degrees are all twaddle, and the saturation test is, of course, a delusion, when the liquor contains fixed salts. An accurate determination of the ammonia can, therefore, only be made by setting it free by the agency of a caustic alkali, distilling it off, and fixing it by means of an acid—for convenience, sulphuric. Mr. F. W. Hartley has published a very useful little pamphlet* in which plain directions are given for carrying out this mode of estimation, and we strongly recommend all gas managers, who have liquors to sell, to adopt this method of determining their value. We may presently have occasion to refer to this matter again, and content ourselves now with the simple announcement of Mr. Hartley's publication.

Recent parliamentary proceedings with respect to gas matters, have, apart from the great case to which we have above alluded, possessed considerable interest. The United General Company succeeded with their Bill in the Commons, having, however, to submit to some reduction of capital, which will not prejudice them, inasmuch as we believe they did not really want it. The impecunious Corporation of Limerick, however, have resolved on carrying their opposition to the House of Lords, and the unfortunate ratepayers in the "City of the Violated Treaty" will be mulcted in the expenses thereof. We, happily, do not pay rates in Limerick, or we should know what to do. The Bill of the Waterford Gas Company has also been passed by a Committee of the Commons. The works being leased, the Company are in a somewhat peculiar position, and an attempt was made to suspend the action of the Gas-Works Clauses Amendment Act, 1871, for some years, so far as the publication of accounts was concerned. It was not, however, successful. The Committee passed the preamble, with the proviso that the Act of 1871 should come into immediate operation. This is a matter of no importance to the company.

That Mr. Raikes is not disposed to be too hard on Gas Companies is clearly shown by his special report to the House on the Bill of the Woolwich, Plumstead, and Charlton Consumers Gas Company. They are a Company subjected to competition. They have a capital of £60,000, of which only £12,000 is entitled to ten per cent. Their opponents have also a capital of £60,000, all of which is entitled to ten per cent. The Bill before the House asked for power to raise further capital to the amount of £60,000, which the Company are allowed to raise in two portions; £30,000 are to be allotted to existing shareholders as in olden times, when Mr. Raikes was not a predominating power. The other £30,000 are to be disposed of by auction or tender, as required by the new Standing Order. We are always grateful for small mercies, and thank Mr. Raikes accordingly.

We now get two reports of the quality of Newcastle gas. The Borough Examiner tests the illuminating power with a Sugg-Letheby burner, and the Company test with a No. 1 "London" Argand, which they wish the Town Council to adopt. The matter has been the subject of negotiation between the Council and the Company. Fourteen-candle power being prescribed by the Special Act, the Town Council offered to change the burner, if the Company would consent to guarantee a minimum of sixteen-candle power. To this the Company would not agree, offering, however, fifteen candles—a proposal the Council would not accept. Thus the Sugg-Letheby remains the official burner. Among the tests reported, we find some made on the same dates with each kind of burner, which we give for what they are worth, not knowing whether they were made at the same place, and at the same hour :—

	Sugg-Letheby.	No. 1 "London."
	Candles.	Candles.
May 29	15·2 ..	17·2
June 1	14·0 ..	15·8

As the quantity of sulphur in Newcastle gas was the subject of some discussion at the recent inquiry, we may mention that the amounts returned on the above-mentioned dates are respectively 7·81 and 7·50 grains per 100 cubic feet.

The Gas Committee of the Corporation of Dundee have made their annual estimates of income and expenditure, and have resolved on a further reduction of 3d. per 1000 in the price of gas.

The Town Council of Southampton having conned over the last accounts of the Gas Company, have discovered a balance which they say ought properly to be devoted to a reduction in the price of gas. The difficulty, of course, is in persuading the Company to see the matter in the same light. It is quite possible that the Company may find other uses for the money. Is their reserve-fund full, and have they a substantial insurance and depreciation fund?

We mentioned some time ago that the Town Council of Hull had written to the British Gas Company, asking whether, and on what terms, they would undertake the public lighting of the old town. An answer has been received, which is not made public, but we may surmise that it was unfavourable to the design of the Town Council, for they have resolved on invoking the aid of the Local Government Board in bringing the Gas Companies to reason. They have asked the Board to send down an inspector to make a full investigation into the circumstances of the gas supply at Hull. Now, at the present moment we are ignorant of the existence of any Act of Parliament which would authorize the Board to engage in an inquiry of this kind; but we shall presently learn their decision.

The Town Council of Halifax have just made their coal contracts, some of them for three years, at what we may call full prices. Of course, there was a little squabble, and the Gas Committee were blamed for making contracts for so long a period in a falling market. They justified themselves, however, by mentioning the fact, that many of those who tendered refused to contract for more than one year. We share the opinion expressed by some in the Council, that coals have reached their lowest price, and believe that Gas Companies must prepare themselves for a rise.

PUBLIC LIGHTING AT NORWICH.—At the meeting of the Norwich Town Council on the 29th ult., the tender of the gas company to light for three years the public lamps at £3 4s. each per annum (3s. a lamp less than the last contract) was accepted.

* "Ammonia Liquor Tests." By F. W. Hartley, A. Inst. C.E. Wright and Co., 55, Millbank Street, Westminster. 1877.

Water and Sanitary Notes.

THE accounts of the Southwark and Vauxhall Water Company, to be presented to the shareholders on Thursday next, do not reveal so favourable a state of affairs as we could have desired. The profits applicable to dividend on ordinary stock and shares only admit of the payment of four per cent. Nor is the report of the Directors assuring. A good deal of money must yet be spent out of revenue in getting the filter-beds and other plant into thorough working order. And then, Mr. Bateman has reported that the Nunhead Reservoir is not in a condition to be brought into service, and has recommended considerable alterations. Affairs at Richmond are but lightly touched upon in the report; but we shall, no doubt, hear more about them at the meeting.

We are sorry to learn that the boring at Messrs. Meux's brewery has been definitively abandoned, and that the lower part of the bore is to be filled up, so as to restore the well to almost its original condition. The failure is much to be regretted, but it does not decide the great question of the possibility of obtaining a supply of water from the lower greensand under London. For a decided answer to this we must wait the result of the boring at Crossness. In the meantime, this failure, and the fact that the Legislature will probably refuse to sanction any further abstraction of water from the river, have induced people to consider further the resources of the chalk districts north of the Thames, and we are given to understand that proposals will be made to furnish additional supplies from the chalk formation. In the meantime, it is to be regretted that so few endeavours are being made to lessen the great waste of water in the Metropolis. Under the intermittent system, waste is inevitable; but by the constant service universally applied, the consumption per head ought to be easily reduced to sixteen or eighteen gallons a day—no mean saving. The difficulties in the way are, no doubt, great, but they have been overcome in other places, and can hardly be insuperable to the great Water Corporations in the Metropolis.

As we suggested some weeks ago that the failure of the Birmingham Corporation to raise a loan at home might, in part, be attributed to alarm created by a speech made in the House of Commons by the late Mayor (Mr. Chamberlain), in which he was reported to have said that some municipal loans ought not to be paid off, it is due to that gentleman to mention that in a letter to *The Times*, which escaped our notice, he denied having made the statement. We are still surprised that more public spirit was not displayed in Birmingham, where there must be a large amount of accumulated wealth, but the Corporation have no reason now to regret the failure. They have borrowed the half million they require, for their projected sanitary improvements, of the Bank of England, at three and a half per cent., thus saving a considerable sum of money and a world of trouble.

The scheme agreed upon for the formation of an united drainage district for Birmingham and its surroundings has, we are glad to say, been approved by the Local Government Board, and a Bill is already prepared to obtain the necessary parliamentary sanction.

The Lower Thames Valley Drainage scheme, or, perhaps, we ought to say the draft Provisional Order of the Local Government Board, is strongly objected to by the Local Board and parishioners of East Moulsey, and it will, no doubt, have to encounter the opposition of the Corporation of Kingston, and some other Local Authorities. A common agreement among these bodies is impossible, and unfortunately there is, in this case, no predominating influence like that exercised at Birmingham, which can reduce the objecting Boards to submission. There are but two courses which can be followed in this case. Either things must be left as they are, or the full powers of the Central Authority must be exercised to compel combination. It was said at East Moulsey that the Order proposes no scheme for the disposal of the sewage. Now, the United Board is formed to deliberate and decide upon a scheme, and objections to any one proposed would be attentively considered. If it were a question of carrying the sewage of the united district to be utilized on a large farm behind Hanwell Lunatic Asylum, we are certain that the proposal would not be listened to. We feel confident that much less expensive and more effective plans will be brought before the Board when it is formed. As to inequalities of representation, we all suffer from that more or less, but we do not see that the smaller places included in this scheme have much to complain of.

PROPOSED PURCHASE OF THE LITTLEBOROUGH GAS-WORKS.—At the meeting of the Littleborough Local Board on the 17th inst., a resolution was passed in favour of effecting a purchase of the undertaking of the gas company, and a committee were appointed to negotiate terms with the directors.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CXXXVIII.

SUBWAYS (*continued*).

It has been a favourite project with those who have interested themselves in street improvements, ever since the plan was first mooted, to obviate the nuisance and inconvenience of opening the roadway of great thoroughfares for laying and repairing gas and water mains, by making subterranean galleries or passages under the principal streets, in which the mains might be deposited with great facility, without annoyance to the public, and to the advantage of the companies interested. The readiness of access to the pipes in the subway, the opportunity afforded for frequent examination, and for the connexion of the service-pipes with the mains, are the chief advantages, of which it was supposed the gas and water companies would have gladly availed themselves, and which they would have been anxious to possess, even at an increased cost. The principle was considered to be good in itself, even by those who opposed the construction of subways most strenuously; but it was believed that their cost was such as to place them outside the pale of practical projects, and that the methods of ventilation proposed by their advocates were altogether inadequate for that purpose.

The expense necessarily attending their formation was undoubtedly such as to limit their application to the busiest thoroughfares of large cities, but in such positions their value and economy are indisputable. The objections on the score of ventilation have vanished before the best of all tests, that of actual experience.

It was supposed that the difficulty of ventilating a subway so effectually as to prevent the light gas which might escape from lodging in arches or recesses, whence it would issue on the least fall of the barometer, and probably form an explosive mixture with the air, would be so great as to prevent absolute security from being attained. These surmises have been proved, both by experiment and actual use, to be erroneous. On consideration, it will at once be seen that there is no analogy, as has been urged, between a subway and a coal-mine in this respect. The latter is a *cul de sac*, and encourages stagnation, unless a strong current is being constantly drawn or driven through it; whereas the former, from the nature of their construction, have a regular draught passing through them; and, if the gratings opening into the street are of sufficient size, it is clear that any escaping gas would, from its lighter specific gravity, necessarily rise to the crown of the arch, and rapidly make its escape out through the ventilating shafts, before the law of diffusion could practically operate.

The Metropolitan Board of Works was constituted in 1855, and from an early period after they came into existence, their attention was directed to the system of subways, owing to the great increase of breaking up the streets for laying gas and water pipes and other things.

In 1857 they advertised for designs to be sent to them for the best mode of constructing subways for taking these pipes. The designs were to be of two classes—subways for first-class streets, and subways for second-class streets. Thirty-nine different designs were received by the Board, and these were referred to a committee for adjudication, consisting of men of great eminence. The following were the committee:—Mr. Robert Stephenson, Mr. Hawksley, Mr. George Lowe, Mr. Wyatt, Mr. Thwaites, Mr. W. Cubitt, and Mr. A. Wright, assisted by Mr. Bazalgette, engineer, and Mr. Marrable, architect to the Board. Three premiums for designs for a first-class street were awarded; one hundred guineas for the best, fifty guineas for the second, and ten guineas for the third; and for a second-class street, three premiums, of fifty, twenty, and five guineas each respectively. The committee stated in their report that the difficulties in the way of arriving at a satisfactory decision had been very great; no general principles were found to apply, nor was it possible either to approve or condemn all the parts of any of the designs submitted to competition; they therefore selected those designs which appeared to them to be most susceptible of such practical adaptations as would render them most generally applicable to the circumstances of the Metropolis.

None of the premiated designs was adopted in its entirety, but Mr. (now Sir) Joseph Bazalgette, the engineer, and Mr. Marrable, the architect of the Board of Works, applied their minds to the subject, and subsequently improved upon the suggestions of 1857.

The first subways constructed in London were those by the Metropolitan Board of Works, in the new street leading from Cranbourne Street to Covent Garden, and in Southwark Street.

That in Covent Garden is a tunnel of a half circle, with a radius of 6½ feet; it is, therefore, 6½ feet high, and 13 feet wide. The Southwark Street subway has a 6 feet radius, and is 12 feet in diameter. From the subways there are side galleries, communicating with the cellars of the houses—one gallery for every two houses—so that by passing up the gallery the service-pipes can be laid without disturbing the surface. These side galleries are 3 feet 9 inches high by 2 feet 6 inches wide. The floor of the subway is solid above the sewer, and is of gravel.

The Thames Embankment subway is 7 feet 3 inches high, and 9 feet in width.

The Covent Garden subway, which is 320¼ feet long, cost, taking all the side galleries and ventilating shafts, and everything connected with it, £2 15s. per foot run. The Southwark Street subway, 3292 feet, and side ways, cost £3 12s. 6d. per foot run.

Small pipes, supplying both gas and water, were laid in the last named as early as the year 1861, and the results were considered satisfactory; but the water and gas companies generally, were averse

to the scheme, on account of the anticipated expense, and the supposed danger associated with subways, and refused to voluntarily make use of them in the manner and to the extent proposed by the authorities.

In 1864 a Bill of a very extreme character was brought forward by the Metropolitan Board of Works, proposing to deal with all the streets and thoroughfares in the Metropolis, and involving a very large outlay for the construction of subways. It was met by the determined opposition of the water and gas companies. The Commons Committee, to whom the Bill was submitted, whilst passing a resolution with reference to the expediency of doing away with the annoyances and inconveniences arising from the breaking up of the streets, limited the operation of the Act to the water companies only. In consequence of that limitation the Board did not think it worth while to proceed with it, and, therefore, they withdrew the Bill.

In the year 1867 the matter was again brought forward in a much modified form, and then a Bill was investigated by a committee of eleven in the House of Commons. After an inquiry lasting ten days, the preamble was declared proved. Owing, however, to Lord Redesdale not being able to form a Committee of the House of Lords, the Bill fell to the ground.

On its introduction again in 1868, it passed through the House of Commons without opposition. The Bill then came before a committee of the House of Lords, and after a six days inquiry, the committee announced their opinion that the promoters had made out their case. Thus, the Metropolitan Subways Act, 1868, received the Royal Assent on the 25th of June of that year.

Its provisions are limited to the subways already authorized to be constructed by the Board of Works. The water, gas, telegraph, and other companies are compelled to lay their pipes in these subways, under a penalty of £20 for each offence in breaking up the streets after the passing of the Act. The cost of removing pipes already laid in the ground and placing them in the subways is paid by the Board. The subways are maintained by the Board in an efficient state of ventilation and repair. All pipes placed therein are maintained by the companies, bodies, or persons to whom the same belong, under the supervision of an officer appointed by the Metropolitan Board.

The City of London Subways Act, 1869, received the Royal Assent in June of that year, and was passed for the purpose of compelling the gas, water, and other companies to use the subways then in course of construction in the Holborn Viaduct and the new streets connected therewith. The provisions of this are similar to the other.

In the years 1861 and 1862 the Corporation of Nottingham purchased land in the centre of the town, and formed two new streets —Victoria Street and Queen Street. In both of these, subways, which now contain the water and gas mains, and the telegraph wires, were made down the centre, with a side way or side connexion to each house for the drain, and gas and water service-pipes. The subway in Victoria Street is 10 feet wide, 6 feet 6 inches high, and 450 feet long; that in Queen Street is 8 feet wide, 6 feet 6 inches high, and 100 feet long. Each has ventilators into the street, consisting of openings in the crown of the arch, covered with gratings 19 inches by 8 inches in size, and at distances about 60 feet apart.

The companies laid the pipes at their own expense, and no charge is made by the corporation for the use of the subways. The side passages are made a charge on the adjacent property. The party who builds upon the land pays the cost of the works, according to the length of his frontage. A subway was subsequently (in 1865) constructed in Lister gate, but the gas and water companies, acting on the advice of their engineer, declined to lay their pipes in them. In this latter the ventilation is by double openings or shafts placed together and covered with gratings.

Gas-pipes have been laid in the subways, or rather in the large sewers, of Paris, less or more, since 1821. The Municipality engineers, however, have, as a rule, discouraged the use of the sewers for that purpose, owing to certain explosions that have occurred in them from time to time for want of adequate ventilation, and some of the pipes so laid have been removed. It would appear, on the other hand, that the engineers of the Ponts et Chaussées entertain a more favourable opinion of their value, as many years ago they introduced gas-pipes in a subway in the Louvre, and under the Place du Carrousel, and also in those of the bridges crossing the Seine, which are in use to the present time.

The advantages arising from the use of subways in busy thoroughfares are so obvious as scarcely to need enumerating. When once formed, the breaking up of the streets, except for the necessary repair of the materials of which the latter are composed, is entirely obviated. The roadways are not interfered with, save by the traffic on their surface, and are consequently more durable, and can be kept in better order. A great source of accident, obstruction, and inconvenience is removed. The saving to the companies interested is immense; there is practically an absence of leakage from mains so laid, and the first cost of laying them is reduced, whilst the pipes, from the facility of inspection, repair, and painting, are better preserved and necessarily less liable to corrosion and decay. Defects are readily detected, and the liability to fracture is reduced to a minimum. The temperature of the air in subways* is more equable than that of the external atmosphere, and there is consequently less tendency to the drawing of the joints of the mains and services. These are better jointed in the first instance; there need be no hurrying with the work, as in busy and narrow streets. The joints, being open to inspection, are not scamped, and the workmen, being sheltered from bad weather, are able to do the work deliberately and in comfort. The pipes are not subject to vibration from the concussion of traffic; and the danger of their settlement is removed, there being no superincumbent pressure, or undermining for sewerage works; and, lastly, there is no liability of contaminating the soil and the water-pipes, as is the case under ordinary circumstances.

It is scarcely creditable to the engineering and chemical professions, taken as a whole, that the opposition to the subways on account of the supposed danger attending their use should have been so strong and persistent. Doubtless, it is easy to be wise after the event, but surely in being wise before the event consists the prescient genius of the human mind. Engineers, unlike mere cloudy theorists, are generally believed to be practical and far-seeing, and it is a misfortune that the judgment of such men should ever be warped by narrow prejudices. Remembering the long struggle that eventually resulted in a legislative victory for the advocates of the subways, it is melancholy to reflect that so much effort and ability should have been expended in opposition to a project, the utility of which is now beyond all cavil.

(To be continued.)

* The temperature in subways, is necessarily much more uniform than the external temperature. The experience in Nottingham is that in summer when the external air was 55° to 62°, the subway readings were 58° to 59°. In the winter, during a severe frost, the temperature in the open air was 20° to 29°; in the subway it was uniformly 43° to 43·75°. In London the difference between the temperatures internally and externally is about 17°.

WATER SUPPLY OF CITIES AND TOWNS.*

SECOND NOTICE.

In resuming our notice of this work, we come to the Second, or Theoretical Division, which is in three chapters, giving us the chemical, the meteorological, and the geological elements. This division, as might be expected, is more elaborate than the previous one. We have a treatise on water and its properties, and also the various sources from which potable waters are obtained, as rain, lakes, streams and rivers, and wells. The comparative purity of these various sources of supply is illustrated by detailed analyses, and the question of river pollution is entered into very fully. This chapter we regard as of special value, with reference to the limited power possessed by the chemist for detecting and removing sewage impurity.

It is boldly stated "that no process of filtration that has yet been devised will remove choleraic dejections from water; and, as it is generally believed that the noxious matter of sewage exists there in the form of minute germs, which are probably smaller than blood globules, a filtration through even a considerable stratum of chalk cannot be relied upon (as some maintain) to free the water perfectly from such germs."

The action of water on lead—a subject not sufficiently considered by professional men—is also entered into. We took special notice of this, from knowing, as a fact, that the lead pipes fixed in a mansion in the county of Surrey had to be renewed, and proper precautions taken, within a comparatively short period of its erection; and on submitting the water to an eminent chemist, he declared that the action on the pipes arose from the extreme purity of the water.

Hard water is also treated on, and Clarke's Softening Process is given at length.

Rainfall and evaporation is the subject introduced in the following chapter, and appears to be complete in all its details, giving us a description of rain-gauges, tables of various kinds for various districts and countries, and experiments on evaporation conducted in France, South America, the East Indies, and of course Great Britain; summing up, as far as the latter is concerned, in these words: "There is no trustworthy basis for generalization as to this question; it is one now under examination, and all that can be said is that the annual loss from a large water surface seems to be about 20 or 25 inches, that the summer loss is least from the largest and deepest bodies of water, but that they lose more in winter than shallower reservoirs."

We cannot give the analysis we desire of the chapter in which is considered the subject of springs and the water-bearing formations of various districts. Of course, allusion is made to Mr. Prestwich's "Inquiry respecting the Water-Bearing Strata around London," and the various experiments by Dr. Dalton and others to determine the yield of springs in proportion to the rainfall; and under this head is considered, in an extremely complete manner, the absorbent properties of various descriptions of soil and rocks. Following this is a geological treatise with reference to water-bearing strata, commencing with the alluvium of the valleys of the Humber and Mersey, and descending through the London clay, the chalk, greensand, upper, middle, and lower Oolite, the lias, new red sandstone, magnesian limestone, the carboniferous series, down to the primary rocks of Devon and Cornwall, giving the several principal towns in England situated on those different formations.

This has reference almost solely to Great Britain; but it is remarked, in concluding this interesting portion of the work, that the field traversed mostly in detail "is more varied, and has been the subject of more minute investigation, than that of any other equal area on the earth's surface. It presents in nearly continuous sequence almost all the rocks characteristic of the successive geological epochs; consequently, it has become, in a great measure, a type of the geology of the whole world."

From the physical peculiarities which regulate the supply to be obtained, we pass on to details of a practical character. We have formulæ respecting the flow of water, the discharge through orifices and over notches and weirs; the flow of water through uniform channels and pipes, not forgetting the elements of friction. All these

* "A Comprehensive Treatise on the Water Supply of Cities and Towns." By William Humber, Assoc. Inst. C.E., Memb. Inst. M.E. London: Crosby, Lockwood, and Co., 1876.

subjects appear to have been examined *con amore* without elaborate verbiage, but with the single purpose of elucidating a subject on which the author has collected numerous facts, and which are here arranged and classified clearly and lucidly.

There is ample evidence in all these chapters that each division has had careful study, and can be read with satisfaction and profit.

THE ALKALI TRADE.*

What cotton fabrics are in our textile industries, that the manufacture of soda is among our chemical trades—viz., the chief and most important. There are, perhaps, few outside the trade, and those who study the statistics of our various industries, who can fully appreciate the vast importance of the alkali trade to this country. Our readers will, however, gather some idea of its extent when we mention that in 1874 no less than 459,756 tons of salt were decomposed, and we exported 5,010,616 cwts. of alkali, of the value of £2,618,034.

Although "kelp" is still made in Scotland, and we continue to import small quantities of "barilla" from Spain, and although two entirely novel processes are worked on a small scale, ninety-nine hundredths of the soda manufactured in this country is produced by the process devised by the unfortunate Le Blanc. The career of this great inventor, his struggles, privations, and eventual death by his own hand, forms a close parallel to that of his countryman and contemporary, Le Bon, the French inventor of gas lighting. "The world," it is said, "knows nothing of its greatest men;" and it is sad to remember that the founders of two of our most important and beneficent industries, which have produced for others incalculable wealth, should have lived in misery and committed suicide in despair.

Le Blanc's process for the conversion of salt (chloride of sodium) into carbonate of soda has three stages:—(1) the decomposition of common salt by means of sulphuric acid, with the evolution of hydrochloric acid; (2) the decomposition of the "salt cake," so formed, by chalk and carbon; and (3) the separation of the carbonated alkali by lixiviation and purification. A complete description of the alkali manufacture will therefore include an account of the manufactured materials employed, and the utilization of the bye-products. This Mr. Kingzett has given us in a masterly manner in the volume before us. After a short but very interesting and suggestive introduction, he begins with an account of sulphur, pyrites and the manufacture of sulphuric acid. He then proceeds to describe the mode of producing salt cake (sulphate of sodium), and its conversion into carbonated and caustic alkali. This part of the work is rendered especially valuable by descriptions of the most recent improvements in apparatus, illustrated by well-executed drawings. Then follow the modes of condensing the hydrochloric acid, evolved in the initial stage of Le Blanc's process, and the several ingenious methods of separating the chlorine to be used in another of our important chemical industries—the manufacture of bleaching powder.

Further on we have an excellent account of what is called "alkali waste," a material which has a strong family likeness to our "foul lime"—real "foul" lime, we mean, and not such as we have seen, from which every trace of sulphur had been removed by carbonic acid. What foul lime is to the gas maker that "waste" is in an intensified degree to the alkali manufacturer. It accumulates in the neighbourhood of large works at the rate of 500 or 600 tons per week, and poisons the air and pollutes the watercourses for miles around. As may be supposed, the difficulty of disposing of this enormous quantity of waste is very great; it is the Beckton difficulty exaggerated some hundreds of times. People at St. Helen's, Widnes, and other centres of the alkali industries, however, are not so squeamish as a few of the inhabitants of Belgravia and Fulham. They paint their houses of a sombre colour, which sulphuretted hydrogen does not affect, and finding that the gas does not poison them, breathe it contentedly, and perhaps, in time, enjoy it, as a Chinaman does the identical flavour in a rotten egg—a luxury in the Flowery Land. However that may be, chemists have not failed in the endeavour to convert the "waste" into an innoxious product, and extract the sulphur which, theoretically, ought to represent the exact quantity used in producing the sulphuric acid originally employed. So complete a success has not attended their efforts, but, at the present time, a large amount of sulphur is extracted from "waste." Unfortunately we do not see that any of the processes suggested or employed would suit the circumstances of gas companies for the treatment of their foul lime, and we may pass on to one of the novel methods of producing carbonate of soda from common salt, which possesses some interest to gas makers, inasmuch as it involves the use of ammonia. The details of this process are carried out with much secrecy, but the chemical reactions which take place are well known, and are of the simplest character. A saturated solution of salt is treated with ammonia, supersaturated with carbonic acid. The result is a double decomposition, by which chloride of ammonium and bicarbonate of soda are produced. The latter being insoluble in a strong solution of the former, falls as a fine powder, which is easily separated by filtration. Ammonia is, of course, recovered from the chloride by distillation with caustic lime. And here is the weak point of the process, bad for the soda maker, but good for the ammonia producer. About five per cent. of the ammonia is lost in each operation.

We have treated this book from our own special point of view, but a few historical notes may be of interest to our readers. When Le Blanc's process was first introduced into England, Pitt's salt duty, with the proceeds of which we had fought Le Blanc's countrymen, was still imposed, and the process received a very limited application. When, however, this tax was removed in 1823, the alkali manufacture rapidly developed. The price of salt fell in London from £35 per ton to £2 10s. per ton. In 1814 soda crystals sold for £60 per ton; in 1861 they were sold for £4 10s. per ton, and are now cheaper. In 1861 there were in Great Britain 50 soda-works, employing over 10,000 workmen, in operation, and their number has since increased.

In concluding this notice, we are happy to be able to express a high opinion of the merits of the book. The author has spared no pains to acquire information, which he imparts in clear and graceful language. Any readers who desire information on the alkali manufacture and the allied industries may consult it with pleasure and profit. It has but one fault—it lacks an index. Chapter headings are all very well in their way, but a waste of time is involved in consulting them, and we hope that Mr. Kingzett will compile a full index for another edition, which we anticipate will soon be called for.

* "The History, Products, and Processes of the Alkali Trade, including the most Recent Improvements." By Charles Thomas Kingzett, Consulting Chemist. With 23 Illustrations. London: Longmans and Co. 1877.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, JUNE 4, 1877.

The Examiners reported that the further Standing Orders applicable to the Coatbridge Gas and Perth Water Bills have been complied with; that no further Standing Orders are applicable to the Ashton-under-Lyne Gas, Louth Gas, and West Surrey Water Bills; and that the further Standing Orders applicable to the Tudhoe and Sunderland Bridge Gas Bill have not been complied with.

The Gas and Water Orders Confirmation (Abingdon, &c.) Bill was committed.

The Bishop Auckland District Gas, Bristol United Gas, and Glasgow Corporation Water Bills, brought from the Commons, were read the first time, and referred to the Examiners.

The Gas and Water Orders Confirmation (Brotton, &c.) Bill was considered in committee of the whole House, and reported without amendment.

Petitions against the following Bills were presented:—Ashton-under-Lyne Gas Bill from Corporation of Ashton-under-Lyne; Bolton Improvement Bill from (1) Halliwell Local Board, (2) Justices of the Peace for the County Palatine of Lancaster, (3) Messrs. Taylor; Dukinfield and Denton Local Boards of Health Bill from London and North-Western Railway Company; Gas and Water Orders Confirmation (Abingdon, &c.) Bill—Ilkeston Gas Order—from Ilkeston Local Board; Heywood Water Bill from (1) Earl of Derby, (2) William Stott and Elizabeth Stott; Perth Water Bill from (1) North British Railway Company, (2) Perth Water Commissioners, (3) Inhabitants and ratepayers of Perth.

Petitions were also presented against alteration in the Bolton Improvement Bill from Richard Henry Ainsworth; against alteration in the Perth Water Bill from Perth General Station Committee and Caledonian Railway Company; for amendment of the Perth Water Bill from Magistrates and Council of Perth, as Commissioners of Police and Local Authority; and in favour of the Colne Gas Bill from Trawdon Local Board.

TUESDAY, JUNE 5.

The Alliance and Dublin Consumers Gas (Bray Supply) Bill was reported without amendment.

The Newport (Monmouthshire) Gas Bill was read a second time and committed.

The Stamford Water Bill was read the third time and passed.

The following Bills, brought from the Commons, were read the first time and referred to the Examiners:—Local Government (Gas) Provisional Orders (Penrith, &c.); Burslem Local Board; Carshalton Gas; Christchurch Gas; Newcastle-under-Lyme Borough Extension and Improvement; Southend Gas.

The Gas and Water Orders Confirmation (Brotton, &c.) Bill was read the third time and passed.

The Local Government Board's Provisional Orders Confirmation (Bishop Auckland, &c.) Bill—to confirm a Provisional Order of the Local Government Board, under the provisions of the Gas and Water-Works Facilities Act, 1870, and the Public Health Act, 1875, relating to the Local Government District of Bishop Auckland, and certain other Provisional Orders of the Local Government Board, under the Public Health Act, 1875, relating to the Local Government District of Hyde, the Boroughs of Plymouth and Ryde, and the Local Government District of West Houghton—was read the first time, and referred to the Examiners.

THURSDAY, JUNE 7.

The Examiners reported that the further Standing Orders applicable to the Dukinfield and Denton Local Boards of Health and the Epsom and Ewell Gas Bills have been complied with; that no further Standing Orders are applicable to the Leicester Gas, Ashton-under-Lyne Improvement, Wakefield Gas, Croydon Commercial Gas, Bolton Improvement, Heywood Water, and Ramsgate Local Board Bills; and that the further Standing Orders applicable to the Newcastle and Gateshead Water, Colne Gas, and Wakefield Improvement Bills have not been complied with.

The following Bills were read a second time and committed:—Ashton-under-Lyne Gas; Coatbridge Gas; Louth Gas; North Cheshire Water; Perth Water; West Surrey Water.

The Dundee Gas Bill was read the third time, with the amendments, and passed.

The Bridgwater Corporation Water Bill, brought from the Commons, was read the first time, and referred to the Examiners.

A petition against the Bishop Auckland District Gas Bill was presented from the Bishop Auckland District Local Board.

FRIDAY, JUNE 8.

The Examiners reported that the further Standing Orders applicable to the Sunningdale District Water Bill have been complied with; and that no further Standing Orders are applicable to the Bristol United Gas and Glasgow Corporation Water Bills.

The following report from the Standing Orders Committee was agreed to:—"That the Standing Orders not complied with in respect of the Tudhoe and Sunderland Bridge Gas Bill ought to be dispensed with, and the Bill allowed to proceed, provided that the name of the Hon. Francis Baring be struck out."

The Newport (Monmouthshire) Gas Bill was reported without amendment.

The Alliance and Dublin Consumers Gas (Bray Supply) Bill was read the third time, and passed.

The Reservoirs Bill, brought from the Commons, was read the first time.

The accounts of the Metropolitan Gas Companies for the year 1876 were presented.

HOUSE OF COMMONS.

MONDAY, JUNE 4, 1877.

The Lords amendments to the Maryport District and Harbour Gas Bill were agreed to.

The following Bills were read the third time and passed:—Local Government (Gas) Provisional Orders (Penrith, &c.); Burslem Local Board; Carshalton Gas; Christchurch Gas; Lowestoft Water, Gas, and Market (Lords); Newcastle-under-Lyme Borough Extension and Improvement; Southend Gas.

The Examiners reported that the Standing Orders not previously inquired into have been complied with in the case of the East Worcestershire Water Bill (Lords).

WOOLWICH, PLUMSTEAD, AND CHARLTON CONSUMERS GAS BILL.

Mr. RAIKES, on Friday, June 1, presented the following special report from the committee on this Bill:—

"The Bill empowers the company to raise £60,000 additional capital. The committee have divided the proposed additional capital into two parts, one of £30,000, or A shares, of £10 each; the other of £30,000 or B shares, also of £10 each. They have authorized the issue of A shares of the company without restriction, in consideration of the company having a capital of £60,000, of which only £12,000 is allowed 10 per cent., the remaining £48,000 being limited to 7½ per cent., and there being another company competing in the same district with a capital of £60,000, upon which they are allowed to pay 10 per cent., upon full amount, and by the present Bill the company are placed under all the modern restrictions as to pressure and illuminating power, to which the competing company are not subject. The B shares are to be sold by auction or tender in pursuance of the Standing Orders of the House, and they have inserted clauses to that effect."

TUESDAY, JUNE 5.

The Bridgwater Corporation Water Bill was read the third time and passed.

The Blackburn Borough Gas, Water, and Extension Bill (Lords) was read a second time and committed.

WEDNESDAY, JUNE 6.

The Woolwich, Plumstead, and Charlton Consumers Gas Bill, as amended, was considered.

The Londonderry Gas Bill (Lords) was read the first time, and referred to the Examiners.

The United General Gas Company (Limerick) Bill was reported.

The Gaslight and Coke Company Bill was reported, "Preamble not proved."

THURSDAY, JUNE 7.

The Waterford Gas Bill was reported.

The Reservoirs Bill was read the third time and passed.

FRIDAY, JUNE 8.

The United General Gas Company (Limerick) Bill, as amended, was considered.

The Gas and Water Orders Confirmation (Brotten, &c.) Bill (Lords) was read the first time and referred to the Examiners.

[For report of the proceeding in the House of Commons Committee on The Gaslight and Coke Company Bill, see Supplement to this week's JOURNAL.]

DRAINAGE OF OXFORD.—Mr. W. H. White, C.E., and engineer to the Oxford Local Board, in a paper recently read before the Ashmolean Society, gave the following particulars of this work:—The total length of new sewers and surface drains is 32¾ miles. Of this length 7¾ miles have been constructed of brick, and 25 miles of stoneware pipes. The temporary pumping power supplied consists of a portable double-cylinder engine of 14 nominal horse power, and a 12-inch centrifugal pump, driven by a belt from fly-wheel of engine. At a fair working speed of 90 revolutions of the engine, 2300 gallons of sewage are discharged per minute, and at present about 1½ million are dealt with daily. The water supply of Oxford is about 2 million gallons per day—that is, 60 gallons per head of the entire population, and in very wet weather the 100 acres contributing surface water to the sewers would yield about the same quantity. Therefore, if the present amount of water continued to be pumped into Oxford, the ultimate wet weather flow would be something like 4 million gallons per day. He concluded by stating that 370 acres of land had been purchased at Sandford for an irrigation farm, to connect which with the pumping-station a rising main of cast-iron pipes, 1½ mile long, had lately been commenced.—*Builder*.

GRAND JUNCTION WATER-WORKS COMPANY.—The following appeared in the *Daily News* of Saturday last:—"Sir,—In the accounts of the Grand Junction Water-Works Company, which have just been issued prior to the general meeting of shareholders on Wednesday next, my certificate as the professional auditor of the company, which was written on the accounts, has been suppressed in the printed copies issued, evidently because I would not certify the accounts to be correct, and pointed out wherein they were erroneous. As there is no other course open to me to put the very numerous proprietary in possession of the truth respecting these accounts before the annual meeting, you will do them and the public a real service by giving publicity to my certificate, a copy of which is subjoined. I am, &c., Robert A. M'Lean. *Copy Certificate.*—I have audited these accounts, and certify: 1. That the item 'Accounts in suspense for adjustment' is overstated by £555 18s. 1d., being the expenses of the committee of investigation, which were unanimously passed and ordered to be paid by the last general meeting of shareholders, and which have been paid. 2. That the balance of £24,765 13s. 5d., stated to be 'applicable to dividend' is incorrect. (*a*) Because it should be reduced by the aforesaid £555 18s. 1d. (*b*) Because it should be further reduced by the inevitable cost of collecting the half year's water-rents (£63,518 17s. 9d.), the gross amount of which is entered as revenue. The 'expenses of collection' charged in the accounts, pertain to the previous half year's rents. (*c*) Because even when reduced, it cannot be 'available for the payment of dividend' until converted into money—£40,281 10s. 2d. of it is still uncollected. A large sum must, therefore, be borrowed from the bankers to make up the amount necessary to pay the dividend. 3. That to the item 'Allowance to company's auditors,' should be affixed the words, 'Subject to arrangement by the general meeting,' which were inserted by the auditors, but have been struck out since the accounts left their hands. 4. That during the half year the collectors received £994 0s. 7d. of water-rents in advance, which they have retained in their own possession, but which should have been paid to the company, and shown in these accounts. 5. That with these exceptions the accounts are correct.—Robert A. M'Lean, Public Accountant, Auditor appointed by the Company, 8, Old Jewry, London, May 30."

Legal Intelligence.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

SATURDAY, JUNE 9.

(*Before the* MASTER OF THE ROLLS, *Lord Justice* JAMES, *and Sir* RICHARD BAGGALLAY.)

In re THE EUPION GAS COMPANY.

APPEAL OF HENRY KELSALL ASPINALL.

This was an appeal from the order of Vice-Chancellor Malins, placing the appellant on the list of contributories in respect of 1000 shares not fully paid up. [Reported in the JOURNAL OF GAS LIGHTING of March 20th.] The facts, shortly stated, were as follows:—Henry Kelsall Aspinall, in March, 1874, received from his brother Joseph a form of application for 1000 shares in the company, and a blank form of transfer for his signature, with a letter asking him to sign and return the documents, and that he (Joseph) would at once pay the full amount of capital due upon the shares, and that no personal liability or risk would be incurred by the appellant. Relying upon this statement, he signed and returned the documents, and the 1000 shares were duly allotted. Joseph paid the £1000 upon the shares, but it was alleged directly after withdrew the money, and the Vice-Chancellor held that that could not be considered as payment, and held that Henry, being the tool of Joseph, was liable to pay the calls made upon the shares.

Mr. HIGGINS, Q.C., and Mr. MILLAR appeared for the appellant, Henry Kelsall Aspinall; Mr. GLASSE, Q.C., and Mr. MONTAGUE COOKSON, Q.C. appeared for the official liquidator.

At the conclusion of the appellant's case,

The MASTER OF THE ROLLS, in giving judgment, said it appeared that Joseph Aspinall induced his brother, Henry Kelsall Aspinall to apply for shares, promising to pay for them, and telling him he would incur no liability by signing the application. He sent the application to Joseph Aspinall, for whose benefit it was made, leaving him to deal with the matter. The allotment was made and communicated to Joseph; the shares were registered, and two cheques of £300 each were paid into the bank by Joseph in respect of them. After the winding up commenced, it appeared that no money had been paid to the company; the whole thing was a sham, because the money paid was the company's own money. In his opinion the shares were not fully paid-up shares, and therefore the decision of the Vice-Chancellor would be affirmed.

Lord Justice JAMES and Sir RICHARD BAGGALLAY concurring, the appeal was dismissed with costs.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

FRIDAY, JUNE 8.

(*Before Vice-Chancellor* HALL.)

THE EDGWARE HIGHWAY BOARD *v.* THE COLNE VALLEY WATER COMPANY.

Mr. DICKINSON, Q.C., and Mr. YATE LEE appeared for the plaintiffs; Mr. COTTON, Q.C., Mr. GRAHAM HASTINGS, Q.C., and Mr. EVERITT for the defendants.

This was an action to restrain the defendants from opening or breaking up certain portions of five roads near Edgware, and from laying any pipes thereunder until they have informed the plaintiffs of the "plan" according to which they proposed to effect such opening and breaking up, and also from further proceeding with the breaking up, already commenced, of another road. The defendants had given to the plaintiffs, on the 30th of May, notice of their intention to break up these roads and lay down their pipes thereunder, and to commence work on the 4th of June; and the principal matter in dispute between the parties was whether, according to the construction of the Acts of Parliament under which the defendants were proceeding, they were bound, before commencing operations, to submit to the plaintiffs any and what plan of the mode in which they proposed to carry out their works. The defendants are a company incorporated by the Colne Valley Water Act, 1873 (36 Vict., cap. 80), for the purpose of better supplying with water Bushey, Pinner, Edgware, and other districts in the counties of Hertford and Middlesex; and as this special Act incorporated the provisions of the Water-Works Clauses Acts, 1847 (10 & 11 Vict., cap. 17), and 1863, which are of general application, the question was one of great interest and importance. By the 28th section of the general Act of 1847, "undertakers" by any special Act authorized to construct water-works are empowered, under the superintendence of the persons under whose control the roads may be, or of their officer, to open and break up the soil and pavements thereof; but before doing so they must, under the 30th section, give to such persons not less than three clear days notice of their intention; and by the 31st section, no road is to be opened or broken up except under such superintendence, "and according to such plan as shall be approved of by such persons or their officer, or in case of any difference respecting such plan, then according to such plan as shall be determined by two justices," a provision being contained in the section that in case the persons so entitled to superintend shall fail to attend at the time fixed for the opening of the road, or shall not propose any plan, the undertakers may proceed without their superintendence. Some information had been supplied by defendants, and they had indicated on a large Ordnance map the line in which they proposed to lay their pipes, but they had not, as the plaintiffs contended they were bound to do, submitted any plan of their own for the approval of the plaintiffs, nor had they so indicated the position of their pipes as to enable the plaintiffs to ascertain whether they would be laid to the centre of the road, in the water tables, under the footways, or under the greensward, not at what depths and with what gradients they would be laid. Without this information, the plaintiffs contended that they could not judge how often the pipes would have to cross the roads, nor to what extent they would interfere with the gas-pipes and sewerage, or even with the surface carriage and causeways. On the other hand, the defendants maintained that, being a body constituted for the public benefit, and bound, in executing their works, to do as little mischief as possible, they were not required to give even so much information as they had already done, and that until the actual commencement of their works they could not indicate the precise position their pipes would occupy. Moreover, that the word "plan" in the Act meant "method or manner," and not "map," and that it never was the practice for water-works companies to submit maps or detailed schemes of their proposed works before commencing operations, but for their surveyors, at the time and on the spot, to point out to the surveyors of the highway authorities how the pipe-laying was to be carried out.

For the plaintiffs it was contended that, as custodians of the roads in the interest of the public, at whose expense they were kept up, it was their duty to see that a proper plan, such as they could sanction, was adopted before the roads were broken up, and that it was most unreasonable to contend that an approval could be given at the moment of commencement of works, the details of which had not been considered.

The argument on behalf of the defendants was that, being a body constituted for the public benefit, and there being no suggestion that they were likely to act wantonly or *malâ fide*, there were no other restrictions than those pointed out by the Act, with which, they maintained, they had, in fact, complied.

The VICE-CHANCELLOR, without calling for a reply, said that according

to the view of the defendants the word "plan" in the 31st section of the general Act was not to be construed in its ordinary sense, but as meaning merely an indication of the general mode or manner in which the breaking up or opening of the roads was to be effected, without rendering it necessary for the defendants to state such matters as the position and depth of their pipes. These were, however, matters which, in his lordship's judgment, should certainly form part of the "plan," and ought fairly and properly to be communicated to the highway authorities in such a manner, and to such an extent, as would enable them to judge whether what was proposed ought to be allowed to proceed, and was a plan which ought to be approved, or whether recourse should be had to the justices. The contention of the defendants, that they had merely to show a general line, without being bound to adhere to it with any particularity, was not correct, nor was the view taken by them of their obligations in accordance with the true construction of the Act. They had, no doubt, to some extent, supplied specifications, but even if what they had given had amounted to a "plan," it was one which had not been "approved." Either, therefore, no plan within the meaning of the Act had been submitted at all, or if any such had been submitted it was one with which the plaintiffs were not satisfied, and treating the case under the latter alternative, the defendants had not gone to the justices, as, in case of difference, the Act provided that the parties should do. Considering, therefore, that there had been no such proposal or plan submitted by the defendants as the Act of Parliament provided, his lordship granted the plaintiffs the injunctions they sought until further order, the chairman of the board giving the usual undertaking as to damages.

(*Before Vice-Chancellor* MALINS.)

SIMMONS *v.* THE VESTRY OF RICHMOND.

In this case the plaintiff sought by injunction to restrain the vestry from working a steam-engine and pumps in the Lower Road, Richmond, in such a manner as to create a nuisance to her. The matter was before his lordship on the 17th of May, as reported in the JOURNAL of the 22nd ult., page 781.

Mr. PEARSON said that the impression produced on his mind, and, no doubt, on that of his lordship, at the last hearing, was that there was only one pump being used.

The VICE-CHANCELLOR said that his impression was that there was only one engine, and that of very small power.

Mr. PEARSON replied that there were in reality three engines down the well, and, in addition to that, there was a large engine and a large boiler in a shed close to the plaintiff's house, and it was that of which she complained.

Mr. GLASSE said that the lease of the premises expired on the 30th of this month. The engine must then cease to work, and the artesian well would, no doubt, be brought into use.

Mr. PEARSON said there was nothing to prevent the vestry from getting the agreement renewed, if the artesian well proved a failure, and artesian wells were not always successful. In the meantime, this lady was being ruined.

The VICE-CHANCELLOR asked what depth had been reached with the artesian well.

Mr. SENIOR: Nearly 235 feet.

Mr. GLASSE said they had just got into the chalk, which contained an unlimited supply of water. The mistake made by the Messrs. Meux, in Tottenham Court Road, with their well was that they went through the chalk into the gault.

The VICE-CHANCELLOR: You intend to stay in the chalk?

Mr. GLASSE said they did. He contended this was a case for damages under the Act. The vestry were bound to supply the town with water, or a *mandamus* could be obtained against them. The 308th section of the Public Health Act provided that where any person sustained any damage by reason of the exercise of the powers of the Act, full compensation should be made to such person by the local authority exercising such powers, and any dispute as to the fact of damage or the amount of compensation should be settled by arbitration. There was, therefore, no necessity for the plaintiff coming to the High Court of Justice at all.

In the course of further discussion, the VICE-CHANCELLOR asked if they had any water in the artesian well.

Mr. SENIOR replied that it filled up 50 feet with water directly they touched the chalk.

After some further discussion,

The VICE-CHANCELLOR stated that he should adjourn the motion for three weeks, and suggested that the vestry had better let the damages be assessed in his chambers.

Mr. GLASSE said if there was any power for his lordship to assess damages it should be done. He was afraid his lordship had not the power. The plaintiff should have proceeded under another section.

The motion was then ordered to stand over till the first motion day after June 30.

ROLLS COURT.—FRIDAY, JUNE 8.

(*Before the* MASTER OF THE ROLLS.)

SOWDEN *v.* DRIGHLINGTON AND GIRDLESOME GASLIGHT COMPANY, LIMITED.

This was a motion to restrain the defendant company from injuring the property of the plaintiff, whose land adjoined theirs, by their operations in excavating for the erection of a new gasholder.

Mr. WALLER, Q.C., and Mr. WILLIAM KARSLAKE appeared for the plaintiff; Mr. CHITTY, Q.C., for the defendants.

Mr. WALLER said his lordship had granted an interim order on the 18th of May, which he now asked to have continued.

Mr. CHITTY said he was willing to admit that there had been some slight damage, to the extent of £15 at the outside; but he was willing to give an undertaking in damages, and submitted that on the balance of convenience the Court would not interfere to stop the defendants works, which were nearly completed. They only wanted to excavate the trench 2 feet deeper, and then the cone would be removed, and a retaining wall built, and any damage occasioned to the plaintiff would be made good.

The MASTER OF THE ROLLS said the defendants had no right to prosecute their works so as to cause a subsidence of the plaintiff's land. The principle of the balance of convenience only applied where there was a question as to the rights of the parties; but here there was no question at all. No one had a right to injure his neighbour. It was merely a question of expense. He was quite certain the work could be prosecuted without injuring the plaintiff, though it might cost a little more, but unless the parties could make an arrangement, the defendants must not carry out their work economically to the injury of the plaintiff.

Mr. CHITTY said the plaintiff bought his land at 1s. per yard, and was willing to sell it at 2s. 6d.; the company offered 2s., but this he declined.

The MASTER OF THE ROLLS repeated that he could not allow persons to take another man's property, or injure it, simply because it was convenient.

After some further discussion, his lordship granted an injunction restraining the defendants from doing, or permitting to be done, anything which might cause the plaintiff's land, or the buildings thereon, to subside or crack, or from carrying away the soil of the plaintiff.

QUEEN'S BENCH DIVISION.

SATURDAY, JUNE 2.

(*Before Justices* MELLOR *and* LUSH.)

SOUTHAMPTON GASLIGHT AND COKE COMPANY, *Appellants*, *v.* THE GUARDIANS OF THE POOR OF SOUTHAMPTON, *Respondents*.

Mr. M'INTYRE, Q.C., and Mr. LAWSON, appeared for the appellants; Mr. MEADOWS WHITE, Q.C., and Mr. BULLEN for the respondents.

In this case a rule had been obtained by the company to set aside an order made upon an appeal to the Court of Quarter Sessions for the borough of Southampton, whereby it was ordered that the award of Mr. Pownall, the arbitrator appointed under the Act of 12 & 13 Vict., cap. 45, sec. 13, on an appeal against the assessment of the company's works to the poor-rate, should be entered as the judgment of the Court, and the costs paid by the company to the respondents. In his award, dated the 10th of July, 1876, the arbitrator affirmed the rate, and directed that the costs of the appeal and reference, amounting to £563 7s. 4d., should be paid by the appellants. The award was served upon the appellants after the Quarter Sessions were over, and the costs were also taxed when it had ceased to be sitting. The appellants protested against this proceeding, and an amended order was subsequently prepared by the Clerk of the Peace, no further proceedings having been taken before the Court itself. The appellants did not object in Court to the taxation having taken place out of sessions. The rule to quash the order of sessions having been obtained, the respondents now appeared to show cause against the same, and it was submitted by them that it was the usual course to tax costs out of Court, and that the taxation having taken place by consent, it was not competent to the appellants to object to it having been done out of sessions. On the other hand, it was contended that the costs must be taxed during the sessions, except it was otherwise arranged by consent and agreement.

Justice MELLOR, in giving his decision, said he was of opinion that the rule ought to be discharged. It was clear to his mind that the object of the Act of Parliament was to obtain the opinion of a skilled person, in matters involving considerations of account and other difficult questions. The present was just the kind of case for the reference prescribed by the statute, and it was referred to Mr. Pownall, a gentlemen thoroughly qualified to decide it. The arbitrator also had power, which he would not have had unless it had been given expressly by the reference, to award costs. This power he exercised in favour of the respondents. But it was now said that although the reference was had by consent of the parties, and by order of sessions, the respondents were not to have their costs because they were taxed when the sessions were not sitting. He (Justice Mellor) thought it was never in the contemplation of the parties that the costs should be taxed in sessions, but only that they should be taxed in proper form, which was done. The statute seemed to show that although the judgment must be entered as the judgment of the Court, it was not necessary that the Court should give any particular direction as to the taxation of costs. The appellants, therefore, were precluded from taking the objection. It was in evidence, moreover, that it was the practice to tax costs out of sessions; and although it was suggested on the other side that there was not enough business at these particular sessions on which to found a practice, he thought that was not sufficient.

Justice LUSH concurred, and said if the costs had been given under sec. 5 of the Act, and nothing had been done by the parties to avoid the effect of that section, no doubt the taxation would have been invalid. The present case, however, arose under sec. 13. It was one of the terms of the reference in this case that the costs were to be in the discretion of the arbitrator. In saying this the parties did not express all that they intended, but left something to be inferred. The order of reference must be read as if it had expressly provided that the costs were to be taxed in the ordinary way by the Clerk of the Peace, and all objections, if any, to this implied term of the reference ought to have been made at the sitting of the Court. The rule must, therefore, be discharged with costs.

ACCRINGTON COUNTY COURT.—FRIDAY, MAY 18.

(*Before Mr.* BLAIR.)

OSWALDTWISTLE LOCAL BOARD *v.* ACCRINGTON GAS AND WATER COMPANY.

This was an action brought by the Oswaldtwistle Local Board to recover £250 from the Accrington Gas and Water Works Company for water, according to contract.

Mr. RADCLIFFE, who appeared for the plaintiffs, in opening the case, stated that the gas and water company agreed to purchase from the local board 30 million gallons of water, at 6d. per 1000 gallons. According to the agreement, the water was to be taken at 10 million gallons a year, commencing in 1874. The water was duly supplied and taken during 1874 and 1875, and each year £250 was paid by the water company to the local board. The Accrington Water Company required the water in consequence of a scarcity in their supply. Their mains were connected with those of the local board, they having been previously supplied with water at the rate of 9d. per 1000 gallons. In 1876 they did not commence to take the water until the 22nd of July. They took water for 17 days to the extent of 3,150,000 gallons, and refused to take the remainder or pay for it.

Mr. JORDAN, who appeared for the defence, said it was on the ground that it stank, and was unfit for domestic consumption. The medical officer of the board in his report said it was.

Mr. RADCLIFFE continued his observations, showing the need of the Accrington Water Company for the water in the first instance; and that as there was considerable rainfall in 1876, the water company's reservoirs would be well supplied, so that they did not require the board's water. They offered to take the remaining 6,850,000 gallons of water during 1877, provided it was similar to what they had hitherto received. He should submit that the same influences which affected the water of the Oswaldtwistle Local Board must affect the water of the Accrington Water-Works Company, and that no quality of water was guaranteed. He considered that they had taken that course as a subterfuge to escape payment for the water. Some of the members of the Oswaldtwistle Local Board were shareholders and directors of the Accrington Water-Works Company.

Mr. JORDAN said that he had given the board notice to produce their medical officer's report, which was put in. Mr. Jordan then said he should apply for a nonsuit on the statement made. He was there merely as a lawyer to do the best for his clients, and as a lawyer he submitted that the local board could only contract under their seal. He quoted the 85th section of the Public Health Act (11 & 12 Vict., cap. 63), which provided that every contract, wherever the value exceeds £10, shall be in writing, and be sealed with the seal of the local board, and shall be signed by five members, &c. Cases on the point had been carried to the superior Courts, and the judges held that, where there was no seal, the contract with the local board was invalid, whether executory or executed. He also argued that as the Local Board of Oswaldtwistle had incorporated with their Act the Water-Works Clauses Act, 1847, section 35 of which provided that the local board were "bound to provide and keep in the pipes to be laid down a supply of pure and wholesome water," sufficient for the domestic use of the inhabitants resident within the board's district, this did away with his friend's contention that there were no conditions in reference to the quality of water. He should submit that it would be an im-

plied term in the contract that the water should be reasonably fit for use, as there was but one main for supplying water to manufactories and for domestic purposes.

Mr. RADCLIFFE, in reply, said the water company had entered into a contract, and were now attempting to get out of it in a most dishonourable way. He submitted that the section quoted was not relevant. It only referred to contracts to be paid out of the rates for work executed for the board.

Mr. JORDAN said that, at common law, any special contract must be under seal.

Other cases were quoted, and after a lengthy legal argument,

Mr. BLAIR gave judgment. He could not help thinking, he said, that the parties should have agreed upon the facts, and submitted the legal points to a superior Court. There was a large sum of money at stake, and a question of principle was involved which it was important to local boards and water-works companies should be settled. Of course, the case was brought to that court by consent, with a reasonable desire to save expense. He decided, without any serious hesitation, that at common law, at all events, if not under the statute, all the plaintiffs contracts were bound to be under seal. Under statute, there was considerable doubt, but he did not think it was necessary to decide whether this contract fell under the quoted section of the Public Health Act, because he was fully convinced that, under common law, local board contracts must be under seal to be valid and binding. He should nonsuit the plaintiffs, with leave to move, as he thought it most desirable that the question of law should be decided by the superior Courts. Had it been a question of fact, he should have decided the case, but it being a question of law purely, he should certainly give the plaintiffs the opportunity of trying it in the higher Courts.

Mr. RADCLIFFE: We thought we were coming here to try the question of fact, and we are very much surprised that this question of law should have been raised.

ST. HELEN'S COUNTY COURT.—WEDNESDAY, JUNE 6.

(*Before Mr.* T. P. E. THOMPSON *and a Jury.*)

NOXIOUS VAPOURS PROSECUTION.

Dr. Angus Smith, Government Inspector of Alkali Works for the Western Division, brought an action against the St. Helen's Chemical Company for having emitted through their chimney a larger quantity of muriatic acid than was allowed by the Act of Parliament.

Mr. HOPKINSON, barrister, of Manchester, appeared for the plaintiff and Mr. SWIFT, St. Helen's, for the defendants.

Mr. *Fletcher*, district inspector, stated that on the 2nd of March he tested the smoke, and found it to contain 8-10ths of a grain of muriatic acid; and on the 14th of March he also tested, and found it then to contain 1·1 grain of the same acid. The Act of Parliament says that only 1-5th of a grain should be allowed to emit from the chimneys of chemical works.

For the defence it was contended that on the first occasion the manager had explained to Mr. Fletcher the cause of the escape of the acid. The second offence happened through the rim of the pan being faulty, an occurrence which was very rare in the trade. These explanations, they thought, had been considered satisfactory, as it was six weeks afterwards before they knew that any action had been taken in the matter.

The JURY gave a verdict against the company for £25 and costs.

DUMBARTON DEBTS RECOVERY COURT.

(*Before Sheriff* STEELE.)

THE MANAGER OF A SKATING RINK AND HIS GAS ACCOUNT.

Mr. R. D. Orr, banker, Helensburgh, as the treasurer of the Helensburgh Gaslight Company, sued *Frederick C. Shepard*, manager of the Helensburgh Skating Rink, for the sum of £16 3s. 9d., being amount of account due for gas supplied to the rink. Liability was denied by the defender, on the ground that he was simply manager of the rink, and was not in law liable for the debts of the company. The pursuers contended that they had supplied the gas on the presumption of the defender's responsibility; that he was the only person they knew in connexion with the rink; and that he had paid a previous account without objection.

The SHERIFF has since issued the following interlocutor:—The sheriff-substitute, having heard parties procurators, finds that in or about the month of September, 1876, a skating rink was constructed at Helensburgh, of which the defender was manager, and to which the public had access by tickets sold by the defender, and paid for to him; finds that various accounts incurred in the erection of the rink were charged by the tradesmen against the defender, and paid by him without any objection being stated by him of his thus being held liable for the amount; finds that for this establishment a supply of gas was furnished by the pursuers on the application of the superintending tradesman, and in this the defender fully concurred, and made use of the gas accordingly on all occasions when he required; finds that in November, 1876, the defender paid to the pursuers an account for gas supplied by them, amounting to £6 9s. 6d., and this he did without making any objection to the account as being charged against him; finds that the pursuers continued to supply gas to the defender in the same way, and on the same understanding of the defender's responsibility, and, indeed, he was the only person the pursuers knew in connexion with the rink against whom they considered themselves to have any claim; finds that the second account for gas furnished became due on the 7th of November, 1876, amounting to £12 15s. 6d., and to this account likewise the defender made no objection with reference to his liability, but simply complained that the price was excessive, and he accordingly wrote to the pursuers a letter, which is in process, in which he makes that objection, and asks the pursuers to send him an account with a reduced rate of charge; finds that this the pursuers declined to do, and, after a short period, during which a further supply of gas, amounting to £3 8s. 3d. had been furnished, they adopted the course of cutting off the supply, and resorted to the present action; finds in these circumstances that the pursuers are entitled to hold the defender as sole debtor of the account pursued for, and that the defender is not entitled to shift the burden of liability on any other party or parties hitherto unknown to the pursuers, and with whom they have never had any dealings; therefore repels the defences, and decerns against the defender in terms of the conclusions of the summons; finds the pursuer liable in expenses, which modifies to £4 12s. 5d., and decerns.

BURGESS HILL AND ST. JOHN'S COMMON GAS COMPANY, LIMITED.—The eleventh annual general meeting of shareholders was held on the 1st inst. —Mr. W. Wood in the chair. The report of the directors showed a satisfactory state of affairs, and the profits of the past year enabled them to recommend that a dividend at the rate of 7 per cent. per annum be paid. This, after placing 3 per cent. on gas-rental to renewal-fund, left a balance of £115 11s. to be carried forward to next year's account. The report and balance-sheet were unanimously adopted. The advisability of reducing the price of gas was discussed, the matter being referred to the directors for their consideration, it being understood that the price would be reduced from 6s. 8d. to 5s. 10d. per 1000 cubic feet, the reduction to come in force on July 1. The retiring directors and auditor were re-elected. A vote of thanks to the directors and to the chairman terminated the proceedings.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone during May, supplied by The Gaslight and Coke Company:—

	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogn.
	*Mean of 21 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Gas supplied from the Fulham works . .	16·32	17·04	15·91	22·62	7·90	16·70	0·66	No trace
Gas supplied from the Beckton and Bow works	16·44	17·06	15·81	36·40	16·22	11·84	0·56	No trace
Cannel gas supplied from the Pimlico works	20·37	21·40	19·71	20·05	13·74	16·06	0·46	No trace

Mean of daily readings of barometer . . . 29·69
" " " thermometer . . . 60·95

* Each observation consists of ten readings of the photometer, at intervals of one minute.

During the month the mean illuminating power of the gas supplied from Fulham was equal to 16·32 candles, that supplied from Beckton and Bow was equal to 16·44 candles, and that supplied from Pimlico (cannel gas) was equal to 20·37 candles; the range was from 15·81 to 17·06 candles in the common gas, and from 19·71 to 21·40 in the cannel gas. The mean amount of sulphur contained in 100 cubic feet of the Fulham gas was 16·70 grains, in the Beckton and Bow gas it was 11·84 grains, and in the Pimlico gas 16·06 grains. The quantity of ammonia in the three gases varied from 4-10ths to about 6-10ths of a grain in 100 feet. The pressure of all the gases was fair, and on no occasion was sulphuretted hydrogen detected in either of them by the ordinary tests.

METROPOLIS WATER SUPPLY.

Dr. Whitmore's report on the composition of the Thames companies and other waters supplied to Marylebone during May:—

—	In Grains, per Gallon.			In Parts, per Million.		In Degrees.	
	Total Solid Matter.	Loss by Incineration.*	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Hardness.	Hardness after boiling Fifteen Minutes.
West Middlesex	20·32	0·72	1·06	0·00	0·07	13·7	2·7
Grand Junction	20·00	0·80	1·06	0·00	0·068	13·5	2·7

* The loss by incineration represents the amount of organic and other volatile matters contained in the Imperial gallon (70,000 grains) of water; the total solid matter, *minus* such loss, consisted principally of carbonate of lime, with small quantities of other equally harmless salts.

The water of both companies, as seen through a glass tube 2 feet in length, was clear, bright, and well filtered. The water of the river Thames at Hampton—the intake of both the above companies—was very much improved, as compared with its condition in the two previous months.

PUBLIC LIGHTING AT MAIDENHEAD.

At the Meeting of the Town Council of Maidenhead on the 1st inst.—the MAYOR presiding,

The TOWN-CLERK reported that the deputation appointed at the previous meeting waited upon the gas company with the view to making an arrangement as to the future lighting of the borough, and that he subsequently received a note from the secretary to the company, asking that the proposition of the corporation should be given in writing. This request was complied with. The offer of the corporation was £3 10s. per lamp for a three years contract, under the same conditions as those last agreed upon; or, failing this, to burn by meter, at the rate of 5s. per 1000 feet, the Town Council to light and extinguish the lamps, provide the meters, and keep the lamps in repair. The gas company, in their reply, stated they were willing to accept the three years contract, at the rate of £3 10s. per lamp, the lamps being supplied with Sugg's 3½ feet regulators; secondly, that the company were also willing, as an alternative, to supply the lamps by meter at 5s. per 1000 feet, subject to the following conditions:—"1. The price to be paid shall be 5s. per 1000 cubic feet of gas. 2. A meter to be provided for every 10 lamps, or fraction of the same. 3. The lamps to be supplied under the provision of this agreement shall, for securing uniformity of consumption between metered and unmetered lamps, be provided with proper self-acting pressure regulators and burners, to the satisfaction of the company. 4. The meters shall be such as are approved by the company, and be provided and fixed by them, and not interfered with by any other person, the cost of which, with expenses of fixing, is to be paid by the corporation. 5. The whole of the present and future public lighting plant to be kept in good repair by the corporation. 6. The lamps to be cleaned, lighted, and extinguished by the corporation. 7. Interest to be paid by the corporation at the rate of 10 per cent. on existing lamp-posts, lamps, burners, &c., each lamp being estimated at £3. 8. The gas-meters shall be examined by the company as often as required, and if any meter shall, upon examination, be found defective, the company shall have power to remove the same for the purpose of repairs, upon giving notice to the town-clerk. 9. The average amount of the indication of all the meters attached to the public lamps under the control of the local authority shall, except as hereinafter provided, be deemed to be the amount consumed by each such lamp. 10. Should it be ascertained that either of the test-meter lamps is extinguished when some or either of the remaining are burning, it shall be assumed that the quantity consumed by such meter shall be the same as that indicated by the other meters, or such meter shall be rejected from the calculation. 11. The gas supplied to any such public lamps shall be permitted to pass unrestricted to and from such self-acting regulator for the whole of the period during which any such public lamp shall be lighted. 12. The gas consumed, as ascertained by the test-meters quarterly, shall be paid for within two calendar months of the termination of each quarter. 13. If either the company or the local authority shall dispute the accuracy of the registration of any meter used for measuring the gas supplied to the public lamps, then such meter shall be tested in the manner provided, and if found to register erroneously, or in case any such meter shall be shown to have at any time ceased to register, notwithstanding gas may have passed through it to the burners, and notwithstanding such meter shall, on being subjected to the test then act correctly, it shall not be deemed to be one of the meters from

which the average aforesaid shall be determined. 14. Any difference which may arise under any of the provisions hereinbefore contained with respect to the local authority between the company and such local authority shall be, from time to time, settled by arbitration, in manner provided by the Lands Clauses Consolidation Act, 1845, with respect to the settlement of disputes by arbitration."

The MAYOR said the committee had had these conditions under their consideration that afternoon, and had made two or three amendments in them, subject to which they recommended the council to burn their gas by meter. He read the amendments, which were to the following effect:—In paragraph 3, "to the satisfaction of the company" was altered "to the mutual satisfaction of the company and the corporation." Paragraph 4 was made to read, "The meters shall be such as are approved by the company, and be provided by the corporation, and fixed by the company, and provided with two locks, one key to be held by either party," &c. Paragraph 5 was amended thus: "The corporation to keep in repair the lamp-posts, lamps, and meters." In paragraph 7, "interest to be paid by the corporation at the rate of *ten* per cent." was altered to "*five* per cent." Paragraph 8 was altered as follows:—"The gas-meters shall be examined by the company and the corporation as often as required; and if any meter shall upon examination be found defective, it shall be immediately repaired at the expense of the corporation." The only other amendment was in paragraph 12 as to the time of payment, which was altered from "within two calendar months of the termination of the quarter" to "within two calendar months of the delivery of the account."

Mr. LOVERING said the offer made by the deputation to the gas company of £3 10s. per lamp was not subject to the condition that the burner should be a 3½ feet one. Since their interview with the company he had thought the matter over, and come to the conclusion that it was most desirable to burn by meter, and not by contract. The great mistake made by the gas company was this—they assumed that the public lamps had been burning twelve hours for 300 nights; whilst the fact was they had not burnt nine hours, as could be clearly proved. He was satisfied that if they burnt for 300 nights, even at 4 feet, the company, at £3 10s. per lamp, would be making a good profit. Still, on the whole, he considered it more satisfactory that they should take their supply by meter, as was done at Nottingham, Paddington, St. Pancras, and at another place not far away—Uxbridge. Here the price charged per 1000 cubic feet was the same as had been offered here—namely, 5s. per 1000 feet, and it had been found that the cost yearly per public lamp was £2 17s. Here was a great saving, and one which they ought to see if they could not effect in Maidenhead. Apart from that, it was always more satisfactory for those who consumed any commodity to pay only for what they consumed. He proposed, therefore, that the committee's recommendation be adopted.

Mr. FULLER seconded the motion. Whether they burned more or less, he said, he thought the system of lighting by meter would be much more satifactory.

Mr. COLMAN said he should rather have gone on pleasantly with the company, if they had accepted £3 10s. per lamp, because it must be evident that the lighting by meter would impose extra labour upon the council. Still he should support the proposition of Mr. Lovering, because he thought it was a proper principle to go upon that they should only pay for what they consumed.

After some further conversation, the recommendation was adopted, and the Town-Clerk was directed to send to the gas company a copy of the conditions amended by the committee, and approved, as amended, by the council.

NICTHEROY (BRAZIL) GAS COMPANY, LIMITED.

The Ninth Annual General Meeting of Shareholders was held on Wednesday, the 6th inst., at the Offices, 5, Great Winchester Street Buildings, London—Mr. H. L. MICHOLLS in the chair.

The SECRETARY (Mr. W. W. Wright) read the advertisement convening the meeting, and the report of the directors was taken as read. It was as follows:—

The directors have the pleasure to report that the working of the company for the past year has been fairly satisfactory. The revenue has been increased by £1200; the increased outlay for working expenses, exclusive of coal, has been only £300, while the reduction in the cost of coal has been about £600, with an increase of nearly 6 per cent. in the quantity consumed.

The directors regret to announce the death of Mr. Pennell, our late chairman, who from the commencement of the company gave the most devoted attention to its interests. They have elected Mr. H. L. Micholls to take his place.

The vacancy thus caused in the board has been filled by the election of Mr. Neate as a director, he tendering his resignation as consulting engineer. In this manner a saving will be effected of £100 per annum without practical change in the administration of the company's affairs. A further reduction of expense has also been secured by Messrs. J. Moore and Co., the agents in Rio, having, rather than relinquish their connexion with the company, consented to accept £600 per annum in place of £750, the commission previously paid. This change took place from October last.

The accounts show that after setting aside a sum of £2000 for the reserve-fund, providing for doubtful debts, and deducting the 2 per cent. interim dividend paid in October last, there remains the sum of £3853, from which the directors recommend a dividend of 3 per cent. for the half year, which will absorb £2567 2s. 5d., and leave £1305 17s. 7d. to be carried forward.

Mr. Martineau is the retiring director, and, being eligible, offers himself for re-election.

The auditors, Messrs. Price, Waterhouse, and Co., retire, and offer themselves for re-election.

Revenue Account, Dec. 31, 1876.

Dr.		*Cr.*	
Coals carbonized	£5,925 6 2	Gas supplied to street-lamps	£10,786 10 6
Purifying materials	46 13 7	Less fines	96 10 3
Carbonizing wages	723 4 5		£10,690 0 3
Yardmen and labourers	530 4 9		
Lamplighters and inspectors	975 3 1	Public buildings	464 2 6
Salaries and commissions	920 1 11	Private consumers	4,020 5 11
Agency in Brazil	712 10 0	Residual products	3,032 0 11
Honorarium to concessionaire, pursuant to arbitration award	250 0 0	Fittings	247 6 0
Maintenance	550 0 0		
Insurance of works	90 0 0		
Brasilian taxes	46 1 4		
Directors remuneration	500 0 0		
Office expenses in London and Brazil, including secretary	454 11 6		
General expenses in London and Brazil, including postage and receipt stamps, and telegrams	204 17 4		
Reserve for doubtful debts	350 0 0		
Auditors	21 0 0		
Interest on debentures	264 17 0		
Discount	22 2 11		
Income-tax	27 7 9		
Law expenses	22 16 10		
Loss on exchange	260 13 10		
Amount carried to reserve to cover depreciation and cost of concession	2,000 0 0		
Balance, being profit for the year	3,556 3 2		
	£18,453 15 7		£18,453 15 7

The CHAIRMAN said he had only to propose the acceptance of the report as it was given to the shareholders. He regretted having to be in the position he then occupied, in consequence of the loss they had sustained in the death of their late chairman, Mr. Pennell, who, he could assure them, always had the interests of the company at heart. The directors had elected him (Mr. Micholls) to fill Mr. Pennell's position, and so far as he was concerned, he would do his best to carry on the working of the company successfully. It was satisfactory to him to take the post at the present time, for he thought they had "turned the corner," and that their affairs were looking somewhat better than in previous years. The report was fairly satisfactory, for though it announced nothing exceedingly wonderful, still it showed progress. The revenue for the past year had been increased by something like £1200, and the extra expenditure had been only about £300. That was not unsatisfactory. The increase, so far as the working of the company went, was not unsatisfactory either. They had had 48 more public lights added to their consumption, which was fair, and there were a few more which they hoped to get shortly—some 15 or 20 probably. The receipts for private lighting had increased from £3100 in 1875 to £3900 in 1876, which was not very large, but still it showed that people were more inclined to take gas. The increase in the quantity of gas made was fairly good also. On the whole he thought the company were progressing, and eventually would be a very good undertaking; but the shareholders had to look forward to a conclusion of their contract, and he hoped to see their reserve-fund, during the time that he was chairman—and he trusted he should be supported by the proprietors in his view—reach a considerable amount, the shareholders being contented with moderate dividends in order to secure themselves against any future circumstances. The appointment they had made—which was referred to in the report—of Mr. Neate as a director would result in a saving of £100 a year to the company. Mr. Neate was in the position of consulting engineer, always there, and gave his serious attention to matters, and he was willing, in the hope of reducing expenditure, to accept a position as a member of the board, and his co-directors thought that in electing him they were only doing what was just in this matter. The reduction made with Messrs. J. Moore and Co. was effected with some difficulty, and to some extent it was a compromise. They trusted that those gentlemen would do their duty fairly in the matter, and the directors would continue to give every attention to the business of the company, and perhaps next year their report to the shareholders would be more satisfactory than that now presented. With these remarks he moved—"That the report and accounts now submitted for the year 1876 be adopted."

Mr. GOTTO seconded the motion. It would, he said, be more satisfactory to the directors to see a larger attendance of shareholders, but they were thankful to those gentlemen who did come. He thought it would be agreeable to all the shareholders to see that they were able this year to put by so large a sum as £2000 towards their reserve-fund. The shareholders knew the duration of the concession was not a long one, and it behoved them, out of their profits, to provide for the end of the concession. The position the company would be in at the conclusion of their period would be something like this—that the Government would either take the works off the company's hands at a valuation, or they would renew the concession. They ought, therefore, to be provided with a reserve-fund, to make up for depreciation of their property, because, possibly, they might not be able to get back, by a valuation, the whole amount of the money spent on the property. It was very satisfactory to know that there now stood to the credit of the reserve-fund so large a sum as £3400 altogether, with the £400 of the company's debentures. This money would accumulate at interest, and, with the additions they trusted they would be able to make every year, would place them in a very satisfactory position at the end of the concession.

In reply to a SHAREHOLDER,

The CHAIRMAN said the concession had between 12 and 13 years to run, at the end of which time he would like to see that a reserve-fund of between £30,000 and £40,000 had accumulated, although he did not think it likely there would be that depreciation of the property. The concession was for 21 years, at the end of which the Brazilian Government had a right to purchase their works at a valuation. Knowing what valuations were, and even assuming that the valuers might value their property at its full cost, it would only be right for them to have such a reserve-fund that they might take it at something like two-thirds.

A SHAREHOLDER: Who is the valuation to be made by?

The CHAIRMAN: There is regular provision made for that, and we think it is exceedingly fair.

Mr. MARTINEAU said the valuation provided for would, in all probability, leave the company with a considerable sum. He had no doubt, when the time came, they would receive a fair sum for their property.

The CHAIRMAN: At the expiration of the privilege, should the contract not be renewed—but, of course, they hoped it would—the province would pay for the materials at a valuation. There would be four valuers—two named by the Provincial Government, and two by the concessionaires; and in the event of their not agreeing, a fifth would be named by the four, or would be appointed by the Minister of Public Works.

Mr. GOTTO: In either of the two events they would be in this position: If the Government purchased the property, the company would have a reserve-fund to cover the depreciation; while if the concession were renewed, they would start their new era with a splendid reserve capital at their disposal. This, he thought, was a proper basis to place their affairs on.

The CHAIRMAN: And if the concession is renewed, we might give the reserve to the shareholders as a bonus.

A SHAREHOLDER: Or extend the works with it.

The CHAIRMAN: Yes, or extend the works; but this we have been doing.

The resolution was carried unanimously.

The CHAIRMAN said the next resolution referred to the declaration of the dividend. By the accounts they would see that they were able to pay a dividend of 3 per cent. for the half year; and with the sanction of the meeting he would propose that that amount be paid as soon as they could get the warrants out, which they would set about immediately after the proposition was carried.

Mr. MARTINEAU seconded the resolution, which was carried unanimously.

The CHAIRMAN: The next resolution I have to propose is that my friend, Mr. William Martineau, who retires by rotation, but who is eligible for re-election, should be re-elected a director of this company. In proposing his re-election I have very great satisfaction. I have now been on the board with Mr. Martineau for some years, and we have agreed in almost everything that has come before us, and a more earnest or better director it would be impossible to have.

Mr. NEATE seconded the resolution, which was carried unanimously.

Mr. MARTINEAU, in reply, thanked the meeting for re-electing him. His attention would always be given, in the most earnest manner, to the interests of the company. He was always close at hand, and able to attend to the company's affairs at any moment.

The CHAIRMAN then moved the re-election of Messrs. Price, Waterhouse, and Co., as auditors, with a remuneration of 20 guineas, the usual rate. These gentlemen had always done their duty most ably.

Mr. MARTINEAU seconded the resolution, which was carried unanimously.

The CHAIRMAN, in closing the business, said he regretted with Mr. Gotto

that meeting had not been more fully attended; for, speaking moderately, he believed the company were doing a very good business.

On the motion of Mr. Bowlman, a hearty vote of thanks to the chairman was passed, and the proceedings then terminated.

MONTE VIDEO GAS COMPANY, LIMITED.

The Fifth Ordinary General Meeting of Shareholders was held at the Cannon Street Hotel, London, on Monday, the 28th ult.—J. Bramley Moore, Esq., in the chair.

The Secretary (Mr. Denniston) read the notice convening the meeting, and the following report and statements of account were presented:—

The directors have to lay before the shareholders the accompanying statement of accounts, and to report upon the general working of the company for the year 1876.

The net profit for the year amounts to £52,241 1s. 5d., and adding the balance brought from 1875, gives a sum to the credit of profit and loss account of £52,861 0s. 1d. Deducting the interim dividend of 4 per cent. paid by the board on the 9th of December last, and the sum of £9000—which is this year passed to contingency-fund—there remains a balance of £22,184 4s. 1d., sufficient for a further dividend of 4 per cent., making 8 per cent. for the year, and leaving the sum of £507 8s. 1d. to be carried forward to the next account.

The remittances from Monte Video have up to the present been insufficient to enable the directors to recommend the immediate distribution of the dividend; they propose, therefore, with the sanction of the shareholders, as soon as sufficient funds are in hand, to call a formal general meeting at which the dividend can be declared; in the meantime, every endeavour is being made in Monte Video to hasten the collections.

The directors who retire by rotation are Bartlett James, Esq., and J. L. C. De Salles, Esq., who, being eligible, offer themselves for re-election.

The auditors, Messrs. Price, Waterhouse and Co., and John Cater, Esq., retire, and offer themselves for re-election.

Balance-Sheet, Dec. 31, 1876.

Dr.				*Cr.*			
Capital subscribed		£541,920	0 0	Capital expenditure, Dec. 31, 1875	£529,924	9 4	
Contingency-fund		25,000	0 0	Add expenditure during 1876, as follows:—			
Dividends unclaimed		980	8 0	New services	639	0 2	
Bills payable		5,190	18 4	Do. station and gasholder	257	8 0	
Sundry creditors, London and Monte Video		12,232	8 6	Do. mains	256	14 9	
Profit and loss account—				Do. extensions at gas-works	1,524	11 4	
Balance, Dec. 31, 1875	£33,135 2 8			Do. dock, building pier, and other works	3,974	7 5	
Dividend paid June 14, 1876.	32,515 4 0			Total capital expenditure to date	£536,576	11 0	
Balance	£619 18 8			Stock of coals at cost	10,273	16 11	
Profit for 1876, as per revenue account	52,241 1 5			Do. gas-fittings	8,835	4 4	
	£52,861 0 1			Do. meters in store and at rental	5,443	17 4	
Deduct interim dividend paid Dec. 9, 1876	21,676 16 0			Do. residuary products	1,404	3 10	
	£31,184 4 1			Do. materials in store for use	3,121	11 1	
Less carried to contingency-fund	9,000 0 0			Do. ditto sale	640	14 6	
Balance available for dividend		22,184	4 1	Sundry debtors, being gas consumers in Monte Video	26,396	15 6	
				Bills receivable in Monte Video	3,342	12 0	
				Bills receivable in transit	3,000	0 0	
				Cash in Monte Video	1,022	3 5	
				Ditto London	3,725	2 3	
				Furniture in London and Monte Video	957	0 6	
				Shipments afloat	2,709	5 8	
				General average on (Moorhill)	59	0 7	
		£607,507	18 11		£607,507	18 11	

Revenue Account.

Cost of manufacture and expenses in Monte Video after making provision for bad and doubtful debts		£48,987	8 11	Sales of gas, residuary products, meter-rent, and sales of fittings	£99,822	9 8	
Directors fees, salaries, and London expenses		2,506	0 2	Revenue from dock and sale of materials	4,545	0 5	
Income-tax		372	13 8	Interest account—balance	1,019	2 1	
Renewal of 70-feet holder		1,528	15 9	Transfer fees	34	2 6	
Balance, being profit for the year		52,241	1 5	Iron lighter	215	5 3	
		£105,635	19 11		£105,635	19 11	

The Chairman: Gentlemen, we meet you to-day with pleasure mingled with some little disappointment. At the same time I think that, upon the whole, I may congratulate you upon the statement of accounts we have to lay before you, and the general report upon the company's affairs. The chief features in the accounts to which I beg to call your attention are these: The net profits for the year 1876, as you will see, were £52,241, and although this is a somewhat smaller gross income than we had in the previous year, yet we are enabled to pay you an equal dividend—viz., at the rate of 8 per cent., which was the amount held out originally on the formation of the company. The consumption of gas by private consumers has diminished, and as they pay more to us per 1000 cubic feet for what they consume than the Government do, this will easily account to you for the difference in our income. But there is not the slightest doubt that as things get restored to order and their normal state in Monte Video, this source of our revenue will increase again, and prove more remunerative than it is at present. You are very well aware of the dreadful state of things they have had to encounter in that country. Commerce has been paralyzed, and the crops have been injured by drought, and all these circumstances operate injuriously, not only upon the means of individuals, but they affect the sale of every article of commerce, whether gas or other necessaries, throughout the whole community. Well, gentlemen, with reference to our profits of the past year, you will see that after deducting the interim dividend of 4 per cent. paid by the board on the 9th of December last, and the sum of £9000, which has been passed to the contingency-fund, there remains a balance of £22,184, sufficient for a further dividend of 4 per cent., making 8 per cent. for the year, and leaving £507 to be carried forward to the next account. Now, the disagreeable part that I have to announce to you is that which I last year had to communicate—the necessity for a delay in the payment of the dividend. This arises, as you are aware, from the accounts, because of the sums of money owing to us, which is something like £27,000. The money has been fairly and truthfully earned, but the payment of it is in arrear, and therefore we can only hold out to you the same expectation that we did last year, and we have no doubt that, with little delay, we shall be in a position to pay the dividend as before. With that object in view, we shall ask you to authorize us, as you did on a former occasion, to hold a *pro formâ* meeting to enable us to declare the dividend when we find ourselves in funds, which, I hope, will not be very long hence. I ought to tell you that of the sum which is owing, about one-half, or £14,000, is due from the Government, or was due from them at the end of last year, and having this large sum outstanding, it leaves us, as I said, without money to pay your dividends. The fact is that, for the business we have to do, and the stock we have to keep, we have not sufficient working capital to enable us to secure regularity in the payment of dividends; but we hope that, as the contingent-fund increases, we shall by-and-by get over our difficulty in this respect. You will see by the accounts that we have locked up, in coals, fittings, meters, materials in store, and residuals, the sum of £29,719, and I think that will explain to you at once why we have no ready money in hand at the present time; but I hope, as I say, by-and-by, that we shall get over this difficulty. The undertaking is going on as prosperously as can be expected, and as regards the general management of the directors, I am fully justified in stating that they have taken every opportunity of redeeming the promises they made to you to look most carefully into the expenditure. You will find that in the past year there has been a reduction in the wages to a very large amount—something like, in round numbers, £8000; there has been a reduction in the general charges of £1545; and a reduction also in the London expenses of £195 or £200. I think these things cannot but be very satisfactory to the shareholders. I need hardly tell you that, in order to the accomplishment of these reductions, great vigilance has been exercised, and I need hardly assure you that such vigilance will continue to be exercised by us in the future, so that as far as reductions, consistent with the maintenance of real efficiency, can be effected, you may rely upon it they will be carried out as far as possible. The sales of gas, as I have explained, were 2½ million cubic feet less last year than in 1875, otherwise we should have had a much better profit. On the other hand, there having been a reduction in the cost of coal of £4253, and in the other items I have mentioned, we are enabled to present the accounts which are now before you, and which, upon the whole, I hope will be considered satisfactory. There is one thing I have yet to bring before your notice, which, however, for the present, is not very satisfactory, and that is the question of the dock. I may say the dock has been a disappointment to us, but this statement you must accept with some caution, because it is hardly fair to take the value of the dock to the company hitherto in estimating what it may be in future. And for this reason, that the ordinary trade of the country which would give occupation to that dock, has been almost annihilated. Shipping at Monte Video has been so completely paralyzed, that the business of the dock can scarcely be said to have had any existence at all. But there can be no doubt as things come round, and as trade recovers itself, the dock will be more in demand. I must also remind you that a rival dock has been established there, which will compete with us, although, perhaps, it does not possess the same advantages and facilities that ours does. Still, for the reasons I have given you, I do not see why we should not look forward with a hopeful feeling as to the future, even with reference to the dock. I have now to move—"That the report be approved and adopted."

Mr. Bartlett James seconded the motion.

Mr. Lowe asked whether the chairman could give the meeting any idea of the income from the dock, apart from the gas-works. The reason he asked the question was because the chairman, in the course of his speech, stated that the directors were short of funds. The two accounts evidently ought to be kept distinct, otherwise they could not tell whether the dock was not sinking a good deal of the profits of the gas. In the last two years, as far as he could make out, the dock had made about £10,700, and the cost of keeping up the dock amounted to £9600. With reference to the sum of £26,396, due from sundry debtors, it appeared to him to be a very large item, and he hoped it did not arise from giving undue facilities to customers who did not pay. Having made these inquiries, he was bound to say that he regarded the state of the company's affairs as extremely satisfactory. There had been, during the past year, considerable reductions in establishment and manufacturing expenses, as compared with previous years, and he thought the shareholders had to record their thanks to the directors for the improvements thus effected. He would be glad to learn from the chairman whether, in case of accident to a ship in the dock, the company would be liable for damages. He knew an instance of a very heavy loss having been involved in this way.

A Shareholder agreed with the last speaker as to the propriety of separating the dock and gas accounts. He suggested that the number of meters in use from time to time should be stated in the report, and some indication as to the increase or reduction in the consumption of gas furnished.

The Chairman said that any details and particulars desired with regard to the consumption of gas, which it would be impossible for them to follow if he read them to the meeting, were quite at the disposal of the shareholders at the office. As to the dock, he thought Mr. Lowe was quite right in making the inquiry, and it was his (the chairman's) duty to answer it. There was no specific account showing the first cost of the dock, but the revenue accounts were separate, and he could tell everything expended on it, and also the income and cost of working it. In giving those particulars, however, it would not be fair for them to judge of the value of the dock to the company in the future. Even though at present it should be worked at some loss practically, still that would be more than compensated by its general utility to the company hereafter. There had been expended in connexion with the dock a sum equal to about £10,000. The gross income for the past year was £4545, and the expenditure was £1353, leaving a profit of £3192. In the previous year the gross income was £6274, and that might be taken as some indication of what they might look forward to in future as business resumed its normal state in the country. Every one present knew, and no one better than Mr. Lowe, the dreadful state of things that had existed there. But in Monte Video, as he (the chairman) could state, from observation, if misfortunes came upon people like a flood, as they often did, prosperity very frequently returned in a most marvellous manner. Mr. Lowe asked about the liability of the company if an accident happened to a ship in the dock. The directors did not consider themselves liable so long as the accident was not brought about by carelessness or mismanagement on the part of their servants.

Mr. Clements said there was a special contract with every ship using the dock, and there was a clause of indemnity printed on the back of each contract.

Mr. James, referring to the inquiry respecting outstanding debts, said he had much pleasure in stating that at Monte Video the accounts were looked after very sharply—quite as well, if not better, than in Rio Janeiro. The consumers paid up very promptly, and he thought it was much to their credit that they did so. With regard to the Government, he could not say quite so much; they required a little more patience. He might remark that the engineer of the company had done his work well. He was a young man, and a very deserving one. The manager also had done his best, and he considered that the company were well served by their staff in Monte Video. Looking at the affairs of the company, and considering the peculiar circumstances of the country, he thought they had done as well as could be expected in the past year.

The motion was put, and carried unanimously.

The retiring directors and auditors were re-elected, and, on the suggestion of the Solicitor, a resolution was adopted authorizing the board to call a *pro formâ* meeting for the declaration of the dividend.

On the motion of Mr. Lowe, a cordial vote of thanks was given to the directors for their attention to the business of the company.

The Chairman acknowledged the vote for himself and colleagues. He said they were much indebted to the shareholders for the indulgence with which they had received the board, for when directors came before their constituents without funds to pay a dividend, the announcement of the fact was not a very welcome one. He could, however, state that the board

had submitted the best accounts in their power, and they hoped to make up their deficiency soon. He could assure the shareholders that their affairs had had great attention at the hands of the board; there were some most useful and able men upon it, and he might particularly allude to the assistance and help obtained from his old friend on his right (Mr. James). The shareholders might look to the directors to do the best for the company in the future.

The proceedings then terminated.

ROCHDALE CORPORATION GAS SUPPLY.

A Meeting of the Rochdale Town Council was held on Thursday last, the MAYOR (Alderman Heape) in the chair.

The Gas Committee presented the following report on their department for the year ending March 31, 1877:—

Gas made this year (estimated), 253,963,000 cubic feet; last year, 241,315,000. Increase, 12,648,000.

Gas sold and used this year, 221,391,000 cubic feet; last year, 212,662,000. Increase, 8,729,000.

Value of gas sold, after deducting discounts, this year, £47,435 4s. 3½d.; last year, £44,112 8s. Increase, £3322 16s. 3½d.

The profits this year amount to £6903 1s. 6½d.; last year, £5497 1s. 6½d. Increase, £1406.

The present number of consumers, 18,550; last year, 18,037. Increase, 513. New lamp services laid this year, 76; making total new services laid this year, 589.

3990 yards of new and additional main-pipes have been laid during the past year in various roads and streets, at a cost of £2200 3s. 8½d.; the services referred to above cost £386 6s. 10d.; extensions on works during year, £16,033 9s. 3d. Making total amount chargeable to capital, £18,619 19s. 9½d.

In referring to the surplus profits for the year, your committee are sorry the amount has not reached the sum that many expected, but this deficit is accounted for in one or two items. The advantages from cheap contracts in coal and cannel have only partly affected the profits this year, as a very large quantity of coal and cannel was in stock last March at the higher prices, together with cannel and coal contracts amounting to 5500 tons unexpired. The advantage expected to be derived from the introduction of hydraulic stoking machinery over hand labour has not been realized this winter, owing to the winter season being far advanced before the men were capable of working them to advantage. The coke receipts are less this year than last, although over 1000 tons more have been sold. This deficit has been caused by the unusually mild winter, and the reduction in the price of coal, making this residual quite a drug in the market.

A large outlay has been made in the erection of a new gasholder and tank (which is working satisfactorily), and will give ample storeage for some years to come.

The amount of money to be borrowed from the Finance Committee during the year ending March 31, 1878, will be distributed over the works as follows, viz.:—

Extension of retort-house	£5,500	0	0
Front buildings, including governor-house	2,550	0	0
Governors	600	0	0
Extension of street-mains	2,500	0	0
Total	£11,150	0	0

Alderman SIMPSON moved—"That this committee recommend the council to order that the price of gas be reduced 5d. per 1000 feet, both inside and outside the borough, such reduction to commence as and from the 31st of March last, and that the discount allowed to consumers within the borough remain as at the present time."* He stated that the profits of the gas-works for the year ending the 31st of March last were, in round numbers, £7000, and there would have been £2000 more than that but for one circumstance which he would explain. At the commencement of the last financial year the Gas Committee made contracts for the supply of coal and cannel at a considerably lower rate than those previously running; but the old contracts had not expired, and during last year they used up as much material at the old prices as would have made a difference of £2000 if all the material had been at the lower rate. This year they would not be under these circumstances. The stock they had in hand would, of course, cost them no more than the cheapest used last year; and the new contracts entered into, though not much less, were not much more than the prices paid last year. Therefore, if the consumption was only the same this year as it was last, they could with safety reckon on a profit of £2000 more, making £9000. They proposed to reduce the price 5d. per 1000 feet, which, with the present consumption, would represent a reduced income of £4000. The effect of this would be that, assuming the consumption to be the same as last year, they would have at the end of the year a profit of £5000. It might be said that in many places they were selling gas at a cheaper rate than in Rochdale. From a list he held in his hand, it appeared that in some towns the price was more, and in some less than in Rochdale, but he would not trouble the council with the details, because they must deal with facts as they found them. The Gas Committee in Rochdale, unlike those in some other towns, had handed over the whole of their profits to the town, representing a sum of nearly £100,000 since the concern first came into the hands of the corporation. That fact placed them at a disadvantage with other towns where the profits had been devoted to the reduction of the capital, but still the price, when reduced, would be something like the average of other towns similarly situated to Rochdale. It was a pity the price could not be still further reduced, and yet them make a profit; but with the gas at the reduced figure and at a profit of at least £5000 at the end of the year, the council had no reason to be otherwise than satisfied.

Alderman SHAWCROSS asked Mr. Simpson to give them the price in Littleborough, Milnrow, and Whitworth.

Alderman SIMPSON said he had not the scale of prices in those places at command, but the comparison would hardly be fair on account of the smallness of production in those districts. He believed, however, the price at Littleborough was 5s. net.

Mr. JOHNSON asked for the prices at Blackburn, Bolton, Manchester, Oldham, and Ashton. He thought the council ought to closely examine the accounts, and then they would find that there were other things that had to do with the price of gas besides the cost of coal and cannel. The council some time ago sanctioned an expenditure of about £5000 on two hydraulic stokers at the gas-works, being told at the time that the saving of these machines would be great in the matter of labour, and that the committee would be independent of anything like a turn-out amongst the men. Taking the past year's accounts, and comparing them with those of the year before, he found that the wages paid to the stokers, without the machines, were £3316; whereas last year, with the stokers that had cost such an enormous sum, the wages were actually more by £500. In the yard labour they found also a large increase—namely, from £494 to £640. This increase in labour was not due to any rise in the labour market, and he thought they ought to have some explanation of it. In the report the committee had issued they stated that the increase in the amount of gas made this year as compared with last was 12 million feet, but the increase in the amount sold was only 8 million feet, so that absolutely a third of all the extra gas made was unaccounted for. As to whether the price they were asked to pay was a fair price, he would direct their attention to what the price was in a few neighbouring towns. In Blackburn the price was 4s. 3d., or with the discount 4s.; in Birmingham, 3s. 1d. and 2s. 7½d.; in Bolton, 3s. 9d. and 3s. 7d.; in Burnley, 3s.; in Huddersfield, 3s. 7d.

Alderman SIMPSON said these were the prices charged to the largest consumers, and after all deductions were made. Moreover, the quality of the gas in these places was not stated.

Mr. JOHNSON said in Manchester the price was 3s. 6d. and 3s. 5d.; in Oldham, 3s. 8d.; in Stockport, 4s.; in Salford, 4s. He had taken towns fairly near to Rochdale, and which ought to be some guide to them. Then again, in Rochdale, the capital account of the works was rapidly increasing, and the committee expected to spend £11,000 this year, all of which, within about £2000, was to be spent at the works. He thought the matter was a most important one, and the council ought to be put in possession of certain information as to whether the £11,000 in question was to be spent in trying Alderman Tweedale's scheme at the old works. He could only suppose that this was the case, and that the committee had abandoned—he had almost said their foolish proposal to erect new gas-works. In conclusion, he said that, looking at the price of gas in surrounding towns, where he saw no special advantages which should enable them to make gas cheaper than at Rochdale, he thought the rate should be lower than it actually was. He also thought an explanation was due for the great increase of wages, and the extraordinary amount of gas that appeared to have been wasted. He did not know that it was any use moving an amendment, because the corporation must have a profit from somewhere, and if they could not get it by charging a legitimate price like other towns, they must get it by an extra tax, in the shape of a gas-tax, instead of paying it directly.

Alderman LITTLEWOOD asked the chairman whether, taking the price of gas in the surrounding towns, and also the quality, Rochdale on the average occupied a favourable position in the price they proposed to charge. Another question was this—what per centage would the contemplated profit of £5000 bear to the whole of the capital employed at the works?

Alderman SIMPSON said he could only answer the first question generally by saying that Rochdale did hold a favourable position. The first towns that Mr. Johnson referred to were those of Bolton and Blackburn. He would take these two first. In Bolton the quality of the gas, according to their own statement, was 17 candles, while in Rochdale during last year the average quality was 18¼ candles. When the quality was over 15 candles of illuminating power, it was usual to reckon each candle as equal to 3d. per 1000 feet, so that in the quality alone they had, in the case of the two towns, a difference equal to 4½d. per 1000. In Bolton the invoice price was 4s., and 4s. 6d. beyond a certain distance. There was a sliding scale of discounts, amounting, in the case of the very largest consumers, to 25 per cent. Taking the illuminating quality into account, the prices compared in this way: In Bolton the price to the largest consumers was 3s. 4½d.; in Rochdale, 3s. 6d. To the smallest consumers the price in Bolton was 4s. 4½d.; in Rochdale, 3s. 9d. In Blackburn the price was 3s. 9d. and 4s., and there did not appear to be any discount, or if there was, there was none recorded in the information received from their gas engineer. The illuminating quality was 17 candles, so that Rochdale gas was much cheaper than that at Blackburn. In Lancaster the price was 4s., 4s. 6d., and 4s. 9d., less 8 per cent. discount if paid within 28 days. In Oldham the price was 4s. 6d., less 10d. within and 6d. without the corporation boundary. The average selling price, according to their figures, was 3s. 9½d., and the quality was 17½ candles, or one less than in Rochdale. At Wigan they sold the gas at 3s. 10d., with 10 per cent. off to large consumers. Of course in Wigan they possessed superior advantages in being near the coal-fields, but when they took into account that fact, and also that the quality was half a candle less, Rochdale did not compare at all unfavourably with them. In Burnley the price was 3s. per 1000, with no deductions, and charged to all consumers alike, and the illuminating quality was put down as 18 candles. An explanation was required here, however. In Burnley, instead of handing over all their profits for the benefit of the town, they had steadily applied a large portion to the extinction of their debt, so that virtually their property was almost freehold, and not chargeable with interest for depreciation. Mr. Johnson had referred to the mechanical stokers, which had been expected to produce such beneficial results. He admitted that the case demanded an explanation, and that explanation could be given. Of course, if there had been no stokers they would naturally have expected the wages to have been more this year than last, because of the increased amount of material that had to be manipulated. But, unfortunately, when the stokers were introduced they were so incommoded by the stock of coal and cannel in the retort-house, that they could not make arrangements for the free working of the stokers. Besides they had to get their men into the use of them, and it was only at the end of the season that they became at all proficient. In these matters they only found themselves in the same position as other places where the stokers had been first tried. Ultimately, however, he hoped to be able to congratulate them upon a saving equal to that in Manchester, where they had just ordered another complete set of these stokers. In referring to the disparity between the increase of gas made and the increase of gas sold, he remarked that both this year and last they had had to depend to a great extent upon estimate as regarded the quantity made. The quantity sold was discovered by the rent-book; but, owing to one of their meters being out of order, the quantity made had not been accurately measured. The result was that last year's amount had been placed at too high a figure, and this year's was perhaps rather understated. As to the contemplated extensions, it would be time enough to discuss them when the estimates were brought before the council. In conclusion, he remarked that a profit of £5000 represented only about 4 per cent. on the whole of the capital employed, but this was after the interest had been paid, and a 75th part of the debt.

The resolution was then put, and carried *nem. con.*

* The present invoice price is 4s. 4d. per 1000, the discounts varying from 2d. to 5d. per 1000 feet, according to the quantity used.

FATAL BALLOON ACCIDENT AT HULL.

A fearful accident occurred at Hull on Whit Monday, the 21st ult., by which a large number of persons were seriously injured, one of whom, a girl named Lucy Ann Hanson, has since died.

It appears that for several years a gala has been held every Whit Monday, in a large field in the Beverley Road, and this year one of the attractions advertised was the ascent of a balloon. Arrangements were made with the British Gas Company for a supply of gas, it being estimated that the balloon would require for its inflation about 18,000 cubic feet. There being a strong wind at the time it was filled, the balloon, although securely fixed to the ground with ropes, swayed vigorously from side to side. We learn from the local papers that close to the ring in which the filling took place there was a "striking machine," against which, just as the ascent was about to take place, the balloon was driven, and a long slit was made in the silk, through which the gas began to escape rapidly. Close to the striking machine which had caused so much damage there was a stall for the sale of hot peas, a kind of refreshment greatly in demand at entertainments of this kind. Very shortly before the balloon drove upon this stall a naphtha lamp had been suspended thereon, and the escaping stream of gas coming in contact with this naked light, a fearful explosion followed.

Spectators of the scene state that what they saw was a vivid flash, as of lightning, followed by a dense white smoke, this in turn being followed by a blaze which lasted so long as there was any of the varnished silk of which the balloon was composed remaining to be consumed. From the midst of this mass of smoke and flame there arose a mighty cry of anguish, and the excitement amongst the spectators was most intense. The policemen on duty at the gala, with many others who were not too much excited

to act, at once rushed to the rescue, and soon one and another were hauled out from amongst the burning mass. When the balloon collapsed, owing to the escape and ignition of the gas, it fell upon quite a crowd of persons, who were completely covered by the silk and the netting in which it was enclosed, and these people, mostly young men and women, and children, were rendered powerless to help themselves. Their position was, besides, rendered the more awful by the fact that the varnish with which the silk composing the balloon was covered, when it became heated, caused the burning material to stick to the hands and faces of the sufferers, and in numberless instances the skin was torn away from hands and faces as the unconsumed material was removed.

Amongst the injured was the little girl, Lucy Ann Hanson, who was so frightfully burned that she expired the next day. An inquest was opened on the body by Mr. J. J. Thornley, the borough coroner, on the 24th ult., when evidence was taken identifying the deceased, and an adjournment was then made to the 7th inst. It is not necessary for us to report more of the evidence than that which shows the arrangements for inflating the balloon, and the circumstances immediately connected with its destruction.

John Robert Warren said he was the inspector of the outdoor department for the British Gaslight Company at Hull. At the latter end of April, Mr. Wood, the manager of the gala, called upon witness, and told him he was going to have a balloon ascent, and asked him if he could provide a 4-inch main. Witness told him they could lay up to a 7-inch main, and Mr. Wood agreed to have this size. The main was laid into the ring, and had a valve at the end. From the end of the pipe to the balloon was a canvas pipe provided by Mr. Metcalfe, the aëronaut. Witness had superintended the filling of two balloons before this, and had been present at the filling of several others. About a quarter or twenty minutes to four they opened the valve. As the balloon filled with gas no portion was left free to flap about. It was a very good balloon. The only hole in it, which was stopped with a solution of india-rubber, had been caused by a hook. The inflation went on successfully, and was completed by a few minutes past seven. The crowd were unruly. They threw sticks and stones at the balloon. There were three or four policemen in the ring, but the crowd outside was great. When the balloon was filled he closed the valve in the ring, and sent a man to close another valve in the street. The car was attached half an hour before the gas was shut off. The top of the balloon, when filled, would be 50 or 60 feet from the ground when the car was attached. When filled, the balloon swayed over the ring, and above the crowd, but occasionally it came down so that they could touch it. Some of them jumped up and broke the netting in a dozen places. They also broke the ropes several times, and the police had to thrash the people back with sticks on several occasions. Ultimately Mr. Whittaker and Mr. Metcalfe got into the car. There was nothing in the direction of the wind to prevent them making the ascent. The balloon was let go, and it rose a little and cleared the ropes. As soon as it got out of the ring the crowd clutched all round the car, and, in witness's opinion, prevented the ascent. There was tremendous shouting and hooting. Anticipating that he would get a crushing, witness cleared to windward. The ring was large enough, in witness's estimation, for the balloon to go off. The car drifted southward, but as the crowd was so very great between himself and the balloon, he saw very little more. The balloon appeared to surge, and there was then a slight explosion or flash. The gas took fire in the balloon, and the flame spread over a very large surface, and seemed to float in a sheet. It was wavy. There were great cries, and witness went to look for Metcalfe and Whittaker, and found them all right. The fabric of the balloon burned for some time, but the gas was gone instantly. Immediately the fire was over, the crowd seemed to get hold of the burning material and run about with it. Did not see any one on fire. The gas was in precisely the same state as if sent into a house. A dull red heat might not have fired it, but a spark or bright red heat would. A red-hot poker, unless of a bright red, would not have fired it. Witness examined the pea-stall at which the balloon was fired. It was between 30 and 40 yards from the ring, and had a "bogie" fire, which consisted of a square basket filled with burning coke, which would fire the gas. If the balloon was ruptured the wind would carry the gas to the fire. There was a slit in the neck of the balloon, which was made in disconnecting the valve from the balloon. In witness's belief the balloon was ruptured in some way, and the gas fired from the pea-stall. He could not see how it was rent. If the crowd had not laid hold of the balloon it would have gone up safe.

Benjamin Metcalfe, of Leeds, said he was an aëronaut. He signed an agreement with Mr. Wood to make an ascent, and originally was to bring a balloon to Hull, capable of holding 36,000 feet of gas. He intended to make a second ascent at Grimsby on the Tuesday, according to his agreement with Mr. Wood, but as the Grimsby Gas Company could not inflate such a large machine, he brought the smaller one to Hull, which was quite new, and with which he had made 13 ascents. It was made of silk, with a coating of india-rubber and oil, and was very inflammable. The wind went down when they commenced to inflate it, but got up again when the balloon was filled. Witness, however, did not consider it unsafe to make the ascent. He attached the car with the help of the men Mr. Wood had provided. Witness had not noticed the pea-stalls with fires. If he had known of them he would have ordered them off at once. He was very particular about fires, and ordered several people out of the ring who were smoking. After he had attached the car he got into it, followed by Mr. Whittaker. Witness tried if the balloon would lift Mr. Whittaker. It would not, and he told him to get out, and he got out. Witness tested the lifting power by means of sand-bags. When Mr. Whittaker got out, a lot of men in the crowd seized the car and took possession of it. They refused to let go, and the wind blew the balloon over, and a lot of boys seized the netting and kept the balloon from rising. Could not tell how the balloon was perforated, but while witness was watching it and directing those who had hold of the car to pull it back into the ring, which they refused to do, the balloon blazed up in the middle. Witness threw himself out, and the gasman got hold of his shoulders and dragged him out of the way. The gas was out in a moment, but the balloon material was on fire for a little time, and the people seized hold of it and made it worse. The accident to the balloon was owing entirely to the misbehaviour of the crowd. Everything was in good order and ready for a start, and he would have been away in three minutes.

After hearing other evidence,

The Coroner summed up, and, in the course of his remarks, said the main point was whether any person was to blame, and, if so, whom? People dealing with a substance like gas were bound to exercise great care in using it. They had heard how Mr. Wood and Mr. Metcalfe dealt with it. Mr. Wood said he was not aware of the vicinity of the fire, and Mr. Metcalfe, upon whom the responsibility, so far as his own life was concerned, seemed to rest, more fully stated that he did not notice fires there, as, if he had, he would have taken steps to remove them before the ascent was attempted. He (the coroner) thought it was his duty to see there were no fires in close proximity to the balloon. At the same time, it was only fair that they must not lose sight of the fact that had the balloon not come in contact with the striking machine and been ruptured the accident would not have happened. He referred to the contradictory character of some of the evidence, and pointed out that Mr. Metcalfe's men said that the crowd took possession of the balloon and pulled it over, whilst others asserted that it was blown over. It was also a question whether proper provision was made for keeping the ring clear. As a similar ring had been used on previous occasions, it was fair to conclude that it was of sufficient diameter. There was a miscarriage somewhere, and the difficulty was to lay it upon the right shoulders, but they would find it difficult to obtain sufficient evidence to bring in a verdict of manslaughter against any man. If any one was to blame, it was between the three men who were in charge of the balloon—viz., the gas inspector, Mr. Metcalfe, and Mr. Wood. But there was another party—viz., the crowd, who were said to have taken possession. They must also consider whether it had not been a miscarriage of a general character, arising from a combination of causes, and one of those things which they felt justified in describing by the name of accident, because they could not fix the responsibility upon the proper person.

The jury then retired, and on their return into court returned a verdict of "Accidental death." But while not attributing criminal negligence to any person, they thought that greater care ought to have been exercised by the persons in charge of the ground and balloon, and strongly recommended that in future no gas balloons be allowed to ascend unless proper precautionary measures to prevent danger to the public were taken by the manager.

PROFESSOR TYNDALL ON GERMS.

[From *The Times*.]

The Friday evening discourse at the Royal Institution (the last for this season) was given by Professor Tyndall, F.R.S., the subject being in continuation of the discourse with which the session was opened.

Professor Tyndall began by illustrating the change from sweet and transparent animal and vegetable infusions to putrefying and turbid ones. The turbidity, he said, was due to swarms of infusoria, the lowest forms of which, called bacteria, were the known agents of putrefaction. He referred to the two rival views regarding the origin of these organisms—the one deriving them from seeds, eggs, or germs, the other from spontaneous generation. Contrasting the power of a luminous beam with that of our best microscopes, he showed, by referring to the recent observations of Dallinger, that the beam can reveal the existence of germinal particles which baffle a magnifying power of 15,000 diameters. Exposing, a year ago, both animal and vegetable infusions, boiled for five minutes, but eminently putrescible, to air proved by the beam to be free from floating matter, they were never found to putrify, or show the slightest inherent power to develop bacterial or fungoid life. The evidence furnished by hundreds of experiments bearing upon this point, and executed with the utmost physical precision, was complete. Last autumn, however, the organic liquids previously experimented on, and which five minutes boiling reduced infallibly to barrenness, were found capable of withstanding 15 minutes boiling, filling themselves afterwards with putrefactive organisms. There is no correction of error here; the two portions of the inquiry are perfectly correct. Either, therefore, the Professor reasoned, in 1876 the infusions had become endowed with an inherent generative energy not possessed by them in 1875, or some new putrefactive contagium external to the infusions, and of a far more obstinate character than that of 1875, had been brought to bear upon them at the later date. By experiments long continued Professor Tyndall convinced himself that in his later inquires the laboratory of the Royal Institution had become filled with a virulently infective atmosphere. He therefore removed his apparatus to the Jodrell laboratory, in Kew Gardens, and exposed his infusions to its less infective air. The result was that liquids which, in Albemarle Street resisted three hours boiling, filling themselves afterwards with putrefactive organisms, were completely sterilized by five minutes boiling at Kew. Either, then, the infusions had lost in Kew Gardens a generative energy which they possessed in the laboratory of the Royal Institution, or their deportment in the laboratory must be referred to the contagion of its air. With a view of making nearer home experiments similar to those made at Kew, a shed was erected on the roof on the Royal Institution. Chambers were prepared in the shed, and charged with infusions which had never been permitted to come near the laboratory. The first experiments failed utterly, the air of the shed proving sensibly as infective as that of the laboratory itself. The cause of this was not far to seek. Professor Tyndall's assistants had passed from the laboratory to the shed and from the shed to the laboratory, unconscious carriers of infection, like those cowherds who, *The Times* informs us, unsuspectingly spread abroad the germs of foot-and-mouth disease. The shed was subsequently disinfected, and uninfected cloths were employed for the preparation and exposure of the infusions. The result was that they remained pellucid, and without any trace of bacterial life. Now a rod 30 feet long would stretch from the infusions in the shed to those in the laboratory. At one end of this rod, five minutes boiling rendered the infusions barren; at the other end the same infusions resisted 180 minutes boiling. Shall we, then, infer that at one end the infusions posess the power of spontaneous generation, and at the other do not? Or that at one end we have obstinately infective, and at the other end comparatively uninfective air? It is needless to dwell upon the absolute similarity of the spread of putrefaction, as here illustrated, to that of infectious disease. There is not a phenomenon of the one which does not find its parallel among the phenomena of the other. Where, then, are we to seek the contagium which so copiously produced the organisms of putrefaction, after the ordeal to which the infusions in the laboratory had been exposed? Professor Tyndall rendered it visible. Placing a small truss of old and desiccated hay, obtained from Heathfield, in Sussex, under a horizontal beam of light sent through the darkened theatre of the Royal Institution, on beating the hay, clouds of fine dust rose into the beam. That was the contagium. Mingled with that dust were the desiccated germs which had spread a plague among the infusions, asserting their vitality after exposure for hours to a boiling heat. Washing these germs from the hay, we obtain an infective virus which, if communicated in the most minute quantity to a perfectly sterilized infusion of any kind, causes it in 20 hours to swarm with putrefactive organisms. It may be, for aught the Professor knew, the contagium of hay fever. Certain it is that in the nostrils of persons affected by this catarrh, *vibrios*, similar to those developed from the hay germs, are found in swarms when the fever is high. How would these obstinate germs act in the wards of a hospital? They cause both animal and vegetable infusions to putrefy. How would they affect the wounds and sores of living men? Would they succumb to ordinary disinfectants? These are questions of the gravest import, which the enlightened student of the antiseptic system will know how to answer for himself. Or, suppose a bunch of this hay shaken in the air of an establishment devoted to the preserving of meats and vegetables, is it not probable that the ordinary process of boiling, by which such preserves are sterilized, would be thereby rendered nugatory, serious commercial loss being the result? It may be added that a wiry hay from Guildford, which did not appear to be old, proved almost as refractory as that from Heathfield. Boiled continuously for four hours, these desiccated germs maintained their vitality unimpaired, while specially resistant germs defied five, six, and, in one instance, eight hours boiling. We now turn to another aspect of the question.

Following the plain indications of the germ theory of putrefaction, we sterilize in five minutes the very infusions which a moment ago were described as resisting five hours boiling. The germs are indurate and resistant, the adult organisms which spring from them are plastic and sensitive in the extreme. The gravest error ever committed by biological writers on this question consists in the confounding of the germ and its offspring. The active bacteria developed from those obstinate germs are destroyed at a temperature of 140° Fahr. Let us reflect upon these facts. For all known germs there exists a period of incubation, during which they prepare themselves for emergence as the finished organisms, which have been proved so sensitive to heat. If, during this period, and well within it, the infusion be boiled for the fraction of a minute, even before the boiling point is reached at all, the softened germs which are then approaching their phase of final development will be destroyed. Repeating the process of heating, every ten or twelve hours, each successive heating will destroy the germs then softened, until, after a sufficient number of heatings, the last living germ will disappear. If properly followed out, the method of sterilization here described is infallible; a temperature, moreover, far below the boiling point suffices for sterilization. Professor Tyndall showed infusions of mutton and turnip competent to resist five hours continuous boiling, but which had been reduced to utter barrenness by the proper application of a temperature of 160° Fahr. Numberless observations indicated that oxygen was necessary to the life of the organisms here under review. A thick scum would often collect upon the top of an infusion, which scum, greedy of oxygen, and appropriating it, permitted no trace of the gas to reach the infusion underneath, which remained on this account as pellucid as distilled water. Hence the idea of sterilizing the infusions by depriving them of air. This was done with perfect success. Subjecting an infusion for four or five hours to the action of the Sprengel pump, and subjecting it afterwards to one minute's boiling, with a view to extinguish its already expiring life, in the great majority of cases germs were destroyed. A minute thus accomplished what 300 minutes, in the presence of air, failed to accomplish. Here, as in all other cases, old and desiccated hay infusion proved most intractable. Nor is the effect here mentioned to be ascribed to a mere suspension of the life of the germs; they are deprived of life by being deprived of air, for when, after a sufficient time, germless air is restored to the infusions, it fails to revive them. It is obvious that these remarks also apply to infusions purged of air by boiling. There is a singular similarity between the vital actions of these lowest organisms and those of the highest. Privation of oxygen stifles both low and high, and excess of oxygen poisons both. Professor Tyndall exhibited infusions of beef and mutton which had been subjected for many weeks to a pressure of ten atmospheres of oxygen, which were sweet, transparent, and without a trace of life. In connexion with this subject, the Professor referred to the beautiful experiments of M. Paul Bert, and concluded his discourse with these words:—"I hardly think it necessary to summarize what has been here brought before you. In fact, the whole discourse is but a summing up of eight months of incessant labour. From the beginning to the end of the inquiry there is not, as you have seen, a shadow of evidence in favour of the doctrine of spontaneous generation. There is, on the contrary, overwhelming evidence against it; but do not carry away with you the notion sometimes erroneously ascribed to me, that I deem spontaneous generation 'impossible,' or that I wish to limit the power of matter in relation to life. My views on this subject ought to be well known. But possibility is one thing and proof is another, and when in our day I seek for experimental evidence of the transformation of the non-living into the living, I am led inexorably to the conclusion that no such evidence exists, and that in the lowest, as in the highest of organized creatures, the method of nature is that life shall be the issue of antecedent life."

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

Taken as an entity, the iron trade of this neighbourhood appears to be rather more encouragingly employed just at present, although it still cannot be said to be by any means brisk. A few of the larger concerns, such as Butterley, Staveley, and Thorncliffe, which have their own ironstone and fuel, are fairly well engaged, these facilities giving them advantages over their competitors, which enable them to underrate all the smaller firms, or those not so favourably circumstanced.

In pig iron prices have remained nominally at the same figures as those given in my last week's report, although there have been actual reductions of small per centages, in order to get transactions out of hand. At the same time it is felt that the weakness of the Scotch iron market may have a further similar effect here, unless the strikes in Lancashire and Northumberland have a natural tendency to make local producers inclined to be firm in their quotations where they can. Manufactured iron remains very quiet throughout Derbyshire, as well as in South and West Yorkshire, few of the works devoted to those branches being more than half employed.

In the brass trade generally there is no pressure of business, although some of the large establishments are still producing a steady output of taps, hydrants, and other articles required by water companies.

Steam coal is in better request at about the same prices, but the colliers strikes elsewhere are causing so many inquiries to come hereabouts that the local coalowners will, doubtless, soon alter their figures in an upward direction.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

The strike in West Lancashire has now fairly commenced, but as the termination of the notices happened to coincide with the commencement of the Newton Races, which are always made a holiday time in this district, it is at present difficult to say how matters really stand. Nearly the whole of the men ceased work on Thursday and Friday, but whether the whole of them will remain out is doubtful, some of them having left their tools in the pits, evidently in the anticipation of an early return to work. So far as the masters are concerned, some of them have withdrawn their notices, but in the Wigan district the colliery proprietors appear to be tolerably unanimous, and unless more than two-thirds of their men at once return to work, many of them have determined to close their pits entirely, even taking out the ponies, which would indicate that they are preparing themselves for a protracted struggle. At present the notices affect upwards of 20,000 men, but not one-half of these are members of the union.

So far as trade is concerned, the market is naturally a good deal unsettled, but prices are not at present materially affected, and generally continue very low. Several gas coal contracts have recently been given out, and consumers have been able to place them at extremely low rates, colliery proprietors, as a rule, being unable to get more than 8s. per ton for good screened qualities at the pit mouth. In other classes of fuel pit quotations remain without material change, good Arley at the pit mouth being quoted at 9s. to 10s. per ton; Pemberton four-feet, 8s. 6d.; common coal, 6s. 6d. to 7s.; burgy, 5s. 6d. to 5s. 9d.; and slack, 4s. to 5s. per ton.

The iron trade continues in a very depressed condition; there is little or nothing in the shape of legitimate business; what few purchases that are being made being mostly of small job lots, which are offered at very low prices. Local makers of pig, finding that they are altogether unable to compete with north country smelters in the common brands, are now turning their attention more to the production of hematites. The finished iron trade shows no improvement, most of the works being very badly off for orders, and prices continue low, Middlesbrough and Lancashire bars delivered into the Manchester district being still quoted at £6 12s. 6d. to £6 15s. per ton, and Staffordshire ditto at £6 15s. to £6 17s. 6d. per ton.

THE COAL AND GENERAL TRADE OF THE NORTH.

(FROM OUR OWN CORRESPONDENT.)

Down to Saturday night the strike of the Northumberland miners continued, but there are hopes that affairs will be arranged this week; of course, the entire coal trade of Northumberland is stopped. The Durham collieries are very busy. The steam collieries of that county have received a large accession of trade. Turns range from a fortnight to three weeks. A good deal of what is called house coal has been turned into steam in this county since the strike. Prices for best sorts have advanced from 11s. 6d. to 12s. 6d. per ton. The price of gas coal is firmer, in consequence of the stoppage of the Northumberland trade, and the withdrawal of second-class Northumberland coals from the market, especially for local consumption; the second-class and inferior Durham coals in the colliery districts bordering upon the Tyne have advanced in price. The strike of the Northumberland miners is causing any amount of inconvenience to trade, and as the Newcastle Races will come round in a fortnight, it is pretty certain that the coal trade of the North of England will remain in a very disorganized condition during the whole of June.

Coasting freights are unsettled. There is a range of about 1s. per ton according to the demand and supply of tonnage. Through the close of the Northumberland coal trade ships have gone elsewhere than the Tyne, and business is more lively at Sunderland, Seaham, and Hartlepool than ordinarily. Generally speaking there is more life in the Durham coal trade than has been noted for the past two years.

The general manufacturing trade of the North has recovered a little. Chemicals were in better demand last week, and quotations were a little higher. The market has a tendency to stiffen. A fair amount of iron is being shipped. Prices are no higher, but any downward tendency is checked for the time. A fair amount of pig iron is sent abroad, and there seems more inquiry for certain sorts of manufactured iron. There is a moderate inquiry for fire-clay goods. The best shipments seem to be to France.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The annual general meeting of the Melrose Gas Company was held on Monday, the 4th inst.—Mr. Curle presiding. The accounts for the past year were submitted and read, and the usual dividend was declared on the £2800 stock of the company.

On Friday week the annual meeting of the directors of the Comrie Gas Company was held. Mr. M'Kenzie, secretary, gave in his report for the past year, from which it was shown that the affairs of the company were in a flourishing condition. There had been an increase in the consumption of gas during the year, which was believed to be owing to the reduction in price made last year. Notwithstanding the increase in the consumption, there had been a decrease in the expenditure for coal. The directors declared a dividend similar to that of last year—namely, 1s. per original share. It was reported that the works of the company were in good order, and that there was every reason to be satisfied with the manner in which the manager performed the duties of his department.

The following is a report of the quality of the gas supplied at Greenock during the month of May:—Number of experiments, 26; durability in minutes, 4-inch flame—minimum, 62; maximum, 72; average, 67·42. Photometer experiments, 26; minimum, 25·50 candles; maximum, 29·65 candles; average, 27·35 candles. Temperature of gas during testing, 59·15°. The gas was free from sulphur and all other impurities.

A meeting of the Finance Committee of the Dundee Gas Commission was held on Monday, the 4th inst., when the estimates of revenue and expenditure for the current year were submitted, and considered at some length. From the accounts it appeared that, during the year ending on the 30th of April last, the revenue was £57,380 6s. 8d., while the expenditure had been £55,853 5s. 8d., leaving a balance on the right side amounting to £19,624 2s. 2d. It was resolved to recommend that the price of gas should be reduced from 4s. 5d. per 1000 cubic feet to 4s. 2d., with the usual discount of 5 per cent. for cash within 28 days. Gas has never, hitherto, been sold in Dundee at such a low price as that now recommended.

The Edinburgh City Analyst's usual report upon the gas supply was submitted to the meeting of the Town Council of Edinburgh, held last Tuesday. It stated the average illuminating power of gas supplied by the Edinburgh Gas Company, on the 30th of May, was equal to 27·60 standard candles, and that of the Leith Company to 26·50 candles.

Dr. Wallace's report on the condition of the Glasgow gas, for the week ending the 2nd of June, shows that in one instance the illuminating power was down as low as 25·35 candles, and that the maximum at the West Street station was 30·11 candles.

The subject of the Glasgow gas supply was under consideration at the monthly meeting of the Town Council, held last Thursday. Bailie Walls, in moving the adoption of the minutes of the Gas Committee, said he was glad to state that they had bought a considerable quantity of the first-class coals necessary at very reasonable prices, considering that attempts had recently been made to advance the price. They had bought about 25,000 tons at prices ranging from 6d. to 1s. per ton higher than they had paid last year, and they had the prospect of soon considerably increasing that amount at the same price. A good deal of talk took place on the question of testing the gas, but the Lord Provost said that the magistrates would see that the Gas Committee gave a supply of gas of the proper quality to the city. Dr. Wallace has recently furnished to the Gas Committee a report upon a series of tests made upon six of the fifty rheometers, which it was resolved to get some months ago for trial in some of the street-lamps.

Before leaving the subject of gas supply, it may be worthy of mention that the "Forfar Slander Case" is again in the Court of Session. On Thursday last the pursuer, Bailie Lowson, convener of the Forfar Corporation Gas Committee, gave notice of motion for a new trial. His advocate, Mr. Scott, asked the Court on the following day for an order to have the evidence printed, and he said that what the pursuer complained of was a verdict contrary to the evidence. He (Mr. Scott) held it to be proved that other people who saw the publication in which the slander occurred put the same meaning upon it as the pursuer did. The Court refused the order for printing, and the motion for new trial was put to the debate roll for an early hearing.

The inhabitants of Newport (Dundee) have taken steps to secure a full supply of wholesome water. The Water Commissioners, at their meeting on Thursday last, thought that a supply should be given at the north end of the bridge, charging a water-rate to be afterwards arranged. The

engineer of the Dundee Water-Works has, at the request of the Water Commissioners, prepared a report on an alternative scheme—the water in one case being delivered at the north end of Tay Bridge; and in the other, being carried across the bridge, and a reservoir formed at Wormit Hill. The cost of the scheme, it was reported, would be about £8278.

At the last meeting of the Police Commissioners of Forfar, a correspondence with the law agents for the Board of Supervision was read as to the closing of the action against the commissioners, with the outline of an interlocutor, agreeing to accept of the commissioners undertaking to carry out the scheme of Mr. Bateman's report on the water supply, under reservation of the board's right to apply again to the Court of Session should that scheme prove insufficient.

New water and drainage works for the burgh of Innerleithen were begun a few days ago, the first sod of the undertaking being cut by the Hon. H. M. Stuart, of Traquair, who has given the free right of the water of the Bold Burn to the inhabitants. Several speeches were delivered and toasts proposed. The works will be finished in about seven months, at a cost of about £6000. There will be laid some 3¾ miles of iron piping.

The pig iron market has been somewhat steady during the past week. Business was done on Friday afternoon at 54s. 1½d. one month, closing buyers at 54s. cash, and sellers 54s. 1½d.

There is a very quiet condition of things in the coal market, and some descriptions of coal are very difficult to sell. Prices seem to be getting weaker, but there is no material change.

Lutterworth Gas Company.—The annual meeting was held on the 4th inst.—Mr. J. Fox in the chair. From the statement of accounts presented it appears that the amount received for gas during the past year was £766 14s. 10d.; for meter-rent, £39 13s. 3d.; for coke, gas tar, &c., £151 1s. 7d. The balance available for dividend was £199 10s. 11d. A dividend at the rate of 7½ per cent. was declared.

Kibworth Gas Company.—The annual meeting was held on the 4th inst. —Mr. W. Grant in the chair. The report showed a slight falling off in the consumption of gas during the past year. The total income, including a balance brought forward, was £1390 5s. 3d., and the expenditure was £940 4s. 10d., leaving a balance in favour of the company of £450 0s. 5d. A dividend of 6 per cent. on the shares was declared, leaving in hand £210 0s. 5d.

The Recent Explosion of Gas at Brighton.—At the meeting of the Brighton Town Council on Wednesday last, the Town-Clerk reported that he had been served with notices of six actions against the corporation, by owners of property and others, claiming compensation for damage done to their premises by the explosion of gas at the south end of Market Street, on the 14th of March last, and which is alleged to have been caused by the corporation steam roller fracturing the main of the gas company.

Sales of Provincial Gas Shares.—At a recent sale by auction, at the "King's Arms," Folkestone, twenty-three £10 shares in the Folkestone Gas Company were offered. Thirteen of them realized £20 10s. each, three £20 12s. 6d. each, six £21 each, and one (of the new issue) £14 10s. At a sale by auction, at the "White Horse," Ipswich, last month, nineteen original £10 shares in the Ipswich Gaslight Company were offered. The first five were sold at £22 10s. each, the second lot at £22 2s. 6d., and the third for £22. The remaining four realized £22 each. Thirty-two new shares were then put up, and brought 15 guineas each.

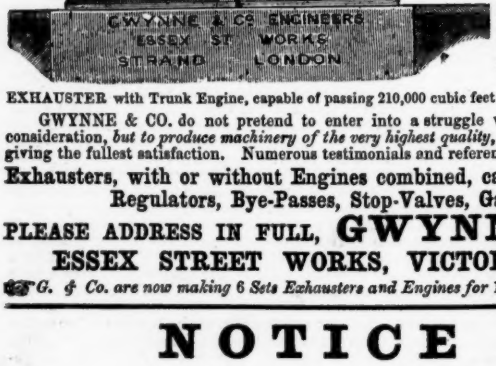
Bury Gas Supply.—At the meeting of the Bury Town Council on Thursday last, a discussion took place with regard to the proposed reduction in the price of gas, the profits on the year just closed available for distribution between the corporation (in the reduction of rates) and the consumers (in the reduction of the price of gas) being stated at £8226. A resolution had been passed in committee, by the casting vote of the chairman, that the initial price of gas for the next twelve months should be 4s. 2d. per 1000 feet, 1s. per 1000 feet to be allowed for the consumers share of profits, and 2d. per 1000 for prompt payment. After an animated discussion, in which a strong opinion was expressed in favour of a still further reduction, the whole question was referred back for further consideration.

Opening of the Clackton-on-Sea Gas-Works.—On Tuesday, the 5th of June, the directors of the Clackton Gas and Water Company met for the purpose of receiving the engineers's report as to the completion of the new gas-works, after which they accompanied him over them, and witnessed the retorts charged and the gas lighted up with great success. These works are situated on the outskirts of the town, and are a model of their kind, being carefully designed so as to comply with present wants, and also to meet all future requirements. They have been constructed from the designs, and under the superintendence, of Mr. Jabez Church, C.E., of 17B, Great George Street, Westminster. This company have powers to manufacture and supply gas, and likewise to supply water, under a Provisional Order, granted by the Board of Trade. Messrs. Hanna, Donald, and Wilson, of Paisley, were the contractors for the ironwork, and Messrs. Saunders and Sons, of Dedham, Essex, for the brickwork. The engineer is preparing plans for the water scheme, which is to be shortly carried out.

Direct-Acting Hydraulic Machines.—At a meeting of the Society of Engineers, held on Monday evening, June 4—Mr. Thomas Cargill, C.E., President, in the chair—a paper was read by Mr. Ralph H. Tweddell on this subject. The author first described the cases in which gearing by shafting, wheels, and belts was used for driving machinery. He then alluded to the advantages of that mode of transmission, especially in large workshops, where the machines were placed far apart. After considering the transmission of power by steam for driving small engines on each machine, he proceeded to describe his application of hydraulic pressure to the transmission of the power, and also to working the tools themselves, To illustrate this part of the subject, he described the differential accumulator, by the special construction of which the effect of a blow is obtained, as well as a steady pressure; and referred to the success which has attended the adoption of his hydraulic rivetters to this combination. After giving some data as to the working of the portable rivetter, one of which can close 5000 ¾-inch rivets in 9½ hours, he described the hydraulic plant at the Toulon Dockyard, where the principal machine shop, 380 feet by 170 feet, is fitted up entirely on his system. Confining his advocacy of hydraulic power to special applications, he claimed that, for certain stated purposes, as compared with gearing, it was cheaper, because it effected a saving in the cost of buildings; safer, in that there was no shifting of belts; more economical, because pipes never got out of order, while shafting always required attention; more efficient, because the friction, &c., in shafting increased the wear and tear; and also because with shafting, to work the smallest machine in a shop it was necessary to drive all the shafting, whereas with water it was not so. Comparing hydraulic with steam power, he showed that, owing to the limited pressure obtainable by the latter, it could never compete with water at 1500 or 2000 lbs. per square inch, even for fixed tools, and that for portable machines it was totally inapplicable.

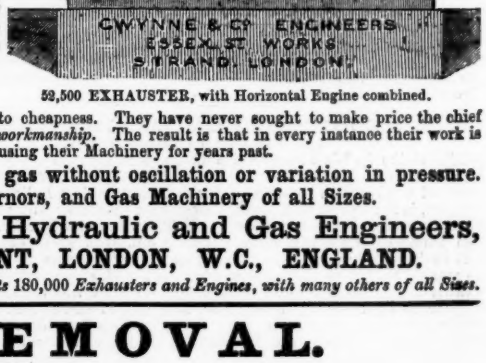
The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, and TWO MEDALS at the PHILADELPHIA EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS;
Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 7,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas without oscillation or variation in pressure.
Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers,
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

☞ *G. & Co. are now making 6 Sets Exhausters and Engines for 105,000 cubic feet per hour, 3 Sets 180,000 Exhausters and Engines, with many others of all Sizes.*

NOTICE OF REMOVAL.

D. BRUCE PEEBLES & CO.

Beg to announce that they have REMOVED to their New Premises,

TAY WORKS, BONNINGTON, EDINBURGH,

To which all communications should now be addressed.

May 30, 1877.

WANTED, in a large Gas-Works, a YARD FOREMAN, who must have held a similar position, and be able to produce satisfactory testimonials. Wages 50s. per week.
Apply by letter only, addressed No. 369, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Draughtsman or CLERK of WORKS, by one who is well up in preparing Drawings and carrying out everything in connexion with Gas-Works. First-class testimonials and references.
Address No. 371, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a practical Gas Engineer, an engagement as ENGINEER and MANAGER. Advertiser is thoroughly experienced in all details of gas manufacture and distribution, the construction of works, and is a good draughtsman. Testimonials and references of the highest character.
Address No. 370, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Manager, for a Gas-Works in Lancashire (where the make is about 10 millions annually). Must thoroughly understand the manufacture, distribution, and testing of Gas, also laying mains, fittings, in and out of Works. Residence on Works, with coals, gas, and water, free.
Applications, stating salary required, accompanied by copies of testimonials, to be sent to H., care of G.W. Hughes, Esq., 4, Cable Street, LIVERPOOL.

THE RATING OF GAS AND WATER WORKS.

A Gentleman of experience in the Rating of Properties of Public Companies is willing to undertake, in the interests of Companies, the Valuation of Gas and Water Works for Rating purposes.
Address, in first instance, No. 367, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Advertiser is desirous of meeting with an Appointment as Gas-Works Manager. He has been employed by his present employers eight years, four of which he has had sole charge of the Works, where the annual make is over 80 million cubic feet. Advertiser understands the manufacture and distribution of gas in all its branches, and is willing to be paid either by results or salary. Good references and testimonials can be given.
Address, JOHN HENRY LYON, Gas Engineer, MACCLESFIELD.

FOR SALE—Hydraulic Main, 18 in. diameter, with ascension and dip pipes complete, for five benches of retorts, suitable for a small Gas-Works.
Apply to SECRETARY, Gas and Coke Works, DEVONPORT.

FOR SALE—A Set of Four Purifiers, 8 ft. by 6 ft., with covers, grids, centre-valve, and 6-in. connexions complete.
Apply to J. GILL, Gas-Works, BRIDGNORTH.

READING GAS COMPANY.

FOR SALE, as they now stand, and at any reasonable price, as the ground upon which they stand is wanted, four 12-ft. square Cast-Iron PURIFIERS, with centre-valve and connexions, grids, tee bars, &c., complete.
Apply to Mr. E. BAKER, Engineer, Gas-Works, READING.

THE Dronfield Gaslight and Coke Com- pany have FOR SALE a set of 4-in. Vertical Condensers; Two Purifiers, 4 ft. by 4 ft.; Three lengths of 12-in. D Hydraulic Main.
Apply to JOHN WHITEHEAD, Manager, Gas-Works, Dronfield, near SHEFFIELD.

TO GAS COMPANIES.

WE beg to call attention to our special STEATITE BURNERS for Street Lamps. Sample gross 8s. Quotations for quantities.
Messrs. TINDALL AND TELLING, Gas Apparatus Works, 74, Wynford Road, Penton Street, LONDON, N.

FOR SALE, CHEAP, 400 4-inch Cast- Iron SOCKET-PIPES, coated.
Apply by letter to J. MYERS, 5, Fortess Terrace West, JUNCTION ROAD, N.W.

FOR SALE, CHEAP, owing to exten sions, Three PURIFIERS, with valves and connexions, in good order.
Apply to the Gas Company, NORTHALLERTON.

FOR SALE—Two Purifiers, 4 ft. 9 in. by 2 ft. 9 in., and 2 ft. 3 in. deep. Sieves in good order.
One CONDENSER CHEST, 9 ft. 3 in. long, 13 in. square. Pipes 5½ in. diameter, 12 ft. high.
One CONDENSER CHEST, 11 ft. 6 in. long by 14 in. square. Pipes 6 in. diameter.
Apply to WM. MARR, Gas Manager, LINLITHGOW.

GASHOLDER FOR SALE.

TO BE SOLD CHEAP, in consequence of the tank being wanted for another purpose, a GASHOLDER about 33 ft. in diameter and 10 ft. deep. To be sold, as it now stands, at any reasonable price. Is in good condition.
Apply to Mr. W. T. HEWS, Gas-Works, HENLEY-ON-THAMES.

TO GAS MANAGERS AND OTHERS.

A MOST useful Lot of Second-hand APPARATUS FOR SALE, including Two 7 ft. square Purifiers, 6-in. Centre-Valve, Condenser, with 6-in. valve and bye-pass, &c., &c.
Full particulars to be had of Mr. GEO. THORNELOE, Engineer, 57, Barbican, LONDON, E.C.
The above may be seen at the Gas-Works, Basingstoke, by applying to Mr. THOMAS, Manager.

GASHOLDER FOR SALE.

ONE Telescopic Gasholder, 70 feet by 20 feet, complete, with cast-iron tank, columns, girders, and inlet and outlet pipes, valves, &c., of modern construction. In first-class condition, and made by Messrs. Piggott and Co., of Birmingham.
To be seen at work at the Gas-Works, Birkenhead.
Cause of removal to make room for extensions.
To be sold a bargain, taken down, and re-erected ready for work.
For particulars, apply to Messrs. ASHMORE AND WHILE, STOCKTON-ON-TEES, or to view to Mr. CALLOW, Gas Engineer, BIRKENHEAD.

TO GASHOLDER MAKERS.

TENDERS are required for the supply and erection of a 40-ft. and a 30-ft. GASHOLDER also for adding One SHEET to bottom of a 27-ft. Gasholder.
Apply to DAVID OLDFIELD, 7, WESTMINSTER CHAMBERS, S.W.

PAMPHLET ON GAS.

COOKING AND HEATING.
HINTS ON GAS-BURNERS, &c.

For GAS COMPANIES to distribute to their Gas Consumers.

Specimen Copy by post Threepence, from the Author, **MAGNUS OHREN, Gas-Works, Sydenham, S.E.**

THE MALTA & MEDITERRANEAN GAS COMPANY, LIMITED.
NOTICE is hereby given that the ORDINARY GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the Offices, 60, Gracechurch Street, London, E.C., on TUESDAY, the 26th inst., at Half-past Eleven o'clock in the forenoon, for the purpose of receiving the Report of the Directors and the Accounts for the year ending the 31st of March, 1877; and the transaction of the general business of the Company.
One of the Directors, Mr. S. Andrews, will retire from office, but is eligible for re-election.
The Transfer Books will be closed from the 19th of June until after the Meeting.
By order of the Board,
E. P. ROWSELL, Secretary.
60, Gracechurch Street, June 5, 1877.

THE Newport (Mon.) Gas Company have FOR SALE the following PLANT at their Works, Newport, Mon.:—
Two Cylindrical Boilers, 13 ft. by 4 ft., with fittings complete, and steam-pipes to engines.
Two Horizontal Engines, each cylinder 9½ in. diameter, and stroke of each 1 ft. 6 in.
Two Beale's Exhausters, made to pass 20,000 cubic feet per hour each, with regulators and bye-pass.
The above are in good order, have been working during the past winter, and are now offered for sale because larger ones have been fixed.
Particulars and prices given for the whole or a portion of the Plant on application to the undersigned.
They can be seen at the Works, Mill Street, Newport, Mon.
THOMAS CANNING, Engineer.
May 18, 1877.

TENDERS FOR A GASHOLDER, CONDENSER, SCRUBBER, STATION-METER, GOVERNOR, AND CONNEXIONS, SEPARATELY.

THE Committee of the Malmesbury Gas Company invite TENDERS for each of the above, erected.
For a view of the works and specifications, apply to WILLIAM CROOME, Gloucester Street, MALMESBURY, to whom all sealed tenders, endorsed "Tender," are requested to be addressed, and not later than the 25th inst.
The Committee do not bind themselves to accept the lowest or any tender.
Malmesbury, Wilts, June 7, 1877.

THE Directors of the Chelsea Water- Works Company invite TENDERS for providing, laying, and jointing in their district about 1800 yards of 18-in., and 2500 yards of 12-in. Straight and Irregular Cast-Iron PIPES.
The specifications and drawings can be seen at the Company's Office, No. 35, Commercial Road, Pimlico, London, any day after Monday, the 18th June inst., between the hours of Ten and Four.
Tenders, addressed to the Secretary, are to be sent in to the Company's Office before Ten o'clock on Thursday, the 28th inst.
The Directors do not bind themselves to accept the lowest or any tender.
By order,
ALBERT GILL, Secretary.

TO CONTRACTORS, GASHOLDER MAKERS, TANK BUILDERS, AND OTHERS.

THE Directors of the Rye Gas and Coke Company, Limited, invite TENDERS for the following WORKS:—
No. 1.—For the construction and erection of a Gasholder, about 52 ft. diameter, and 17 ft. high.
No. 2.—For the construction of a Brick Tank for the same at the Company's Works at Rye.
Parties tendering for either or both contracts can inspect plans and specifications between the hours of Ten a.m. and Four p.m. at the Office of Messrs. Messer and Thorpe, Engineers, 8, Quality Court, Chancery Lane, London.
Tenders must be sent in on or before Monday, the 25th day of June inst., endorsed "Tender for Gasholder and Tank," and addressed the Secretary, Watchbell Street, Rye, Sussex.
The Directors do not bind themselves to accept the lowest or any tender.
By order,
G. SLADE BUTLER, Secretary.
Rye, June 5, 1877.

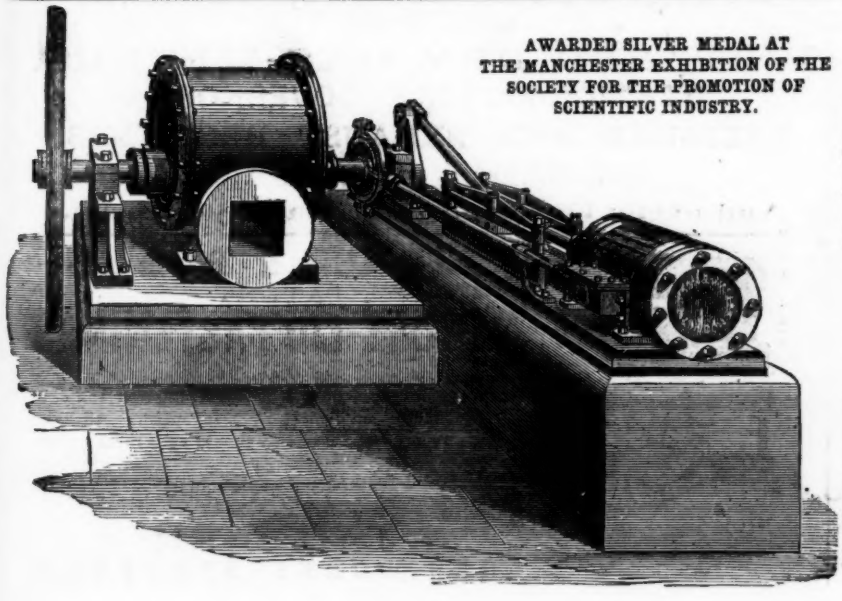
Just Published, Price 2s. 6d.,

COMMON SENSE FOR GAS USERS,

Being a Catechism of Gas Lighting for Householders, Gas-Fitters, Architects, Engineers, Millowners, &c.

By ROBERT WILSON, C.E.

CROSBY, LOCKWOOD, & CO., 7, STATIONERS HALL COURT, E.C.



AWARDED SILVER MEDAL AT THE MANCHESTER EXHIBITION OF THE SOCIETY FOR THE PROMOTION OF SCIENTIFIC INDUSTRY.

BEALE'S
Improved Patent
GAS-EXHAUSTERS
WITH
ENGINES COMBINED.

Sole Makers,
GEORGE WALLER & CO.

Makers of
ENGINES, EXHAUSTERS,
INDEX and DISC GAS-VALVES,
HYDRAULIC MAIN VALVES,
BYE-PASS VALVES,
TAR, LIQUOR, and other PUMPS
SCRUBBERS and PURIFIERS,
CONDENSERS, BOILERS, &c.

PHŒNIX ENGINEERING WORKS,
HOLLAND STREET, S.E.,
AND
STROUD, GLOUCESTERSHIRE.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Buxton Local Board invite Tenders for the supply of 1000 Tons of GAS COAL, free from smudge, bats, and other impurities, to be delivered in such quantities and at such times as may be directed by their Manager during Twelve months from the 1st of July next to June 30, 1878.

Tenders, addressed to the CHAIRMAN of the Gas Committee, to be sent in on or before the 14th inst., endorsed "Tender for Gas Coal."

TO COLLIERY PROPRIETORS AND OTHERS.

THE Oldham Corporation Gas-Works Committee are prepared to receive TENDERS for a supply of about 50,000 Tons of CANNEL and COAL during the year ending the 29th of June, 1878.

Particulars may be obtained on application to Mr. Herbert Andrew, Gas Offices, Oldham.

Tenders to be sent in on or before Tuesday, the 19th of June, 1877.

By order,
H. BOOTH, Town-Clerk.

Oldham, June 8, 1877.

THE Directors of the Oakengates and St. George's Gas Company invite TENDERS for the supply of 1200 Tons of well-screened GAS COAL, as free as possible from sulphur, bats, bind, refuse, and dirt, to be delivered free at the Great Western Railway Station, Oakengates, in such quantities as may be required between Aug. 1, 1877, and Aug. 1, 1878.

Tenders, of which the Directors do not bind themselves to accept the lowest or any, must be sent to the undersigned not later than July 1.

GEO. PARKER, Manager.

Oakengates, Salop, June 8, 1877.

TENDERS WANTED FOR LAYING GAS-MAINS AT BARROW-UPON-SOAR.

THE Quorndon and Mountsorrel Gas, Coke, and Coal Company are prepared to receive TENDERS for carefully taking up and properly cleaning about 800 yards of 3-in. and 2-in. Socket GAS-PIPES, and replacing them with 330 yards of 4-in., and then the old 3-in. as far as they will reach, and the remainder (about 200 yards) with new 3-in. pipes.

Parties may tender for the pipes, labour, and all complete, or for the labour alone, according to specifications to be seen at the Office of Mr. CAMM, the Manager, Quorndon, near Loughborough, to whom tenders must be sent, on or before Monday, the 25th of June, inst.

June 8, 1877.

TENDERS FOR COALS.

THE Directors of the Quorndon and Mountsorrel Gas, Coke, and Coal Company are prepared to receive TENDERS for the supply of 500 Tons (21 cwt. to the Ton) of the best description of Screened GAS COALS, or two-thirds of the quantity Coals, and one-third Silkstone Nuts. They are to be as free as possible from sulphur, bats, bind, refuse, or dirt, and delivered free at Barrow Station.

Tenders, stating the Coals and the pit at which they are to be raised, must be sent to me on or before June 25th next.

Payments monthly.

Three hundred Tons may be sent between now and October next, and the remainder as requested.

J. CAMM, Manager.

TENDERS FOR GAS COAL.

THE Directors of the Guildford Gaslight and Coke Company are prepared to receive TENDERS for the supply of 2600 Tons of Pelaw Main, Ravensworth, or New Pelton COALS, to be delivered at their Works as follows:—

200 Tons	. . . . .	August, 1877
300 ,,	. . . . .	September, 1877
400 ,,	. . . . .	October, 1877
400 ,,	. . . . .	November, 1877
500 ,,	. . . . .	December, 1877
400 ,,	. . . . .	January, 1878
400 ,,	. . . . .	February, 1878

Equal proportions to be delivered each week in every month.

Tenders to be sent in on or before July 9, 1877, stating name and description of Coal, endorsed "Tender for Coal."

The Directors do not bind themselves to accept the lowest or any tender.

JOS. SHAW, Manager.

Office, Gas-Works, June 7, 1877.

TENDERS FOR GAS COAL.

THE Corporation of Walsall invite TENDERS for the supply of 20,000 Tons of Staveley, Yorkshire, or any other good GAS COAL, to be delivered, during One year, from the 1st of August next, either at Walsall Railway Station, or by boat at Walsall Old or New Gas-Works. In the latter case it will also have to be unloaded and stacked in the coal-shed, or such other place at the Gas-Works as may be directed. The Coal will have to be delivered at the rate of from 180 to 700 Tons per week, as the Corporation may from time to time require.

The weight, if delivered by rail, must be 2352 lbs. to the Ton; if by boat, it must be 22 cwt. to the Ton, boat gauge.

Payments monthly.

The Corporation do not bind themselves to accept any tender, and they reserve the right to divide the contract between several firms.

Tenders, sealed, and marked outside "Tender for Gas Coal," and stating the price for large Coal, and also for Nuts, are to be sent to the undersigned, on or before Thursday, the 28th of June inst.

SAMUEL WILKINSON, Town-Clerk.

Bridge Street, Walsall, June 6, 1877.

T. NEWBIGGING,
CONSULTING GAS ENGINEER,
5, NORFOLK STREET, MANCHESTER.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

Now ready, price One Shilling, No. 7 (to be continued Monthly) of

A TREATISE ON THE SCIENCE & PRACTICE
OF THE
Manufacture and Distribution
OF
COAL GAS.

LONDON: WILLIAM B. KING, 11, BOLT COURT, FLEET STREET,
OR OF ANY BOOKSELLER IN TOWN OR COUNTRY.

For the convenience of persons resident in remote districts, arrangements have been made by the Publisher to forward the "Treatise" by Post, securely packed on a roller, at the cost of the number and postage only—viz., 1s. 2d. Monthly, or 7s. for the Half Year.

Now ready.

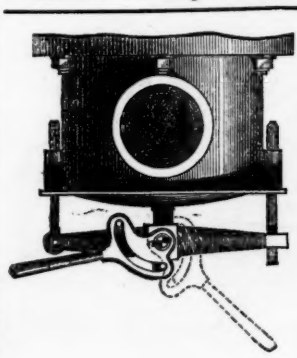
THE GAS & WATER COMPANIES DIRECTORY
FOR THE YEAR 1877,
EDITED BY
CHARLES W. HASTINGS,
8, BUCKINGHAM STREET, ADELPHI, LONDON, W.C.
THIS WORK IS UNDER THE PATRONAGE OF ALL THE LEADING GAS & WATER ENGINEERS AND SECRETARIES OF THE METROPOLITAN & PROVINCIAL COMPANIES.
Price 5s. in Cloth Covers; by post, 5s. 2d. | Price 3s. 6d. in Paper Covers; by post, 3s. 8d.
PUBLISHED BY MESSRS. MARCUS WARD & CO., OF LONDON AND BELFAST.

BRAZILIAN IRON-WORKS, MALTON, YORKSHIRE.

THOMAS READ & CO.,
General Ironfounders and Manufacturers
OF
GAS AND WATER SOCKET-PIPES,
2-inch to 8-inch, can supply from Stock.
LONDON AGENT:
J. MYERS, 5, FORTESS TERRACE WEST, JUNCTION ROAD, N.W.

J. EDMUNDSON & CO.,
19, GREAT GEORGE STREET, WESTMINSTER,
LONDON, S.W.,
MANUFACTURERS OF EVERY DESCRIPTION OF
GAS APPARATUS.
CONTRACTORS FOR THE
ERECTION OF GAS-WORKS, GAS-FITTINGS, &c.,
FOR TOWNS, COUNTRY MANSIONS, &c.
Estimates given free of Charge.

GEORGE ORME & CO.,
ATLAS METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS.
STATION-METERS, GOVERNORS,
PRESSURE AND EXHAUST REGISTERS,
LAMP-METERS IN CAST-IRON BOXES,
And every Description of Gas Apparatus.



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PATENT
RETORT-LID FASTENINGS
Have now stood the test of experience, and have been found one of the greatest improvements in retort-house appliances yet invented. All who desire security and economy should give them a trial.

Prices and further particulars will be given on application to
J. STORER,
GAS-WORKS, STAFFORD.

B. GIBBONS, Jun.,

DIBDALE FIRE-CLAY, BRICK, AND GAS-RETORT WORKS,

STOURBRIDGE (Established 1834),

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts,

A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular . 14 in., 15 in., 16 in., 18 in.

Ovals . . 17 in. × 14 in., 17 in. × 15 in., 20 in. × 15 in., 21 in. × 15 in., &c.

D's. . . { 14 in. × 14 in., 15 in. × 12 in., 15 in. × 13 in., 17 in. × 14 in., 18 in. × 13 in.
{ 18 in. × 15 in., 20 in. × 16 in., 22 in. × 14 in., 24 in. × 14 in., 24 in. × 15 in., &c.

Special attention given to the execution of Export Orders.

J. T. B. PORTER & CO.,

GAS ENGINEERS & MANUFACTURERS,

IRONFOUNDERS AND CONTRACTORS,

GOWTS BRIDGE WORKS,

LINCOLN.

LONDON OFFICES: 1, WESTMINSTER CHAMBERS, S.W.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.

J. & J. BRADDOCK,

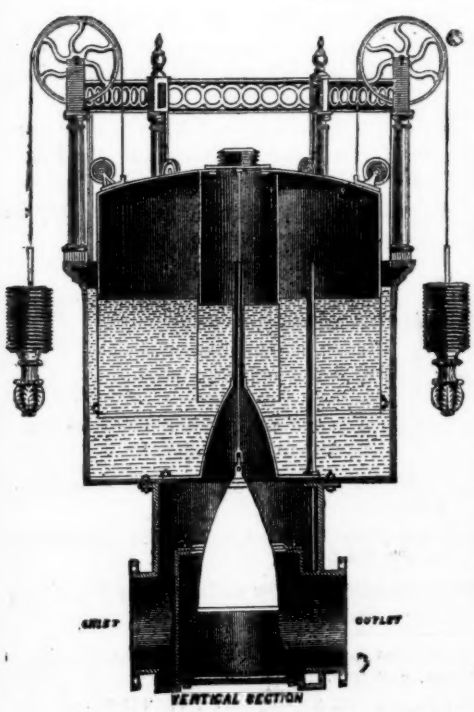
GLOBE METER-WORKS,

OLDHAM,

Beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

BELFAST CORPORATION GAS-WORKS.

THE Gas Committee of the Belfast Corporation invite TENDERS for a year's supply (50,000 Tons) of Best GAS COAL, delivered at the New Crane Wharf, on the Blackstaff River, free of all charges, in the following Monthly Quantities:—

1877.—July	. . . . .	1,500 tons.
,, August	. . . . .	2,000 ,,
,, September	. . . . .	3,500 ,,
,, October	. . . . .	5,500 ,,
,, November	. . . . .	7,000 ,,
,, December	. . . . .	8,000 ,,
1878.—January	. . . . .	6,500 ,,
,, February	. . . . .	5,500 ,,
,, March	. . . . .	4,000 ,,
,, April	. . . . .	2,500 ,,
,, May	. . . . .	2,000 ,,
,, June	. . . . .	2,000 ,,
		50,000 tons.

Should parties offering so desire, they may tender for delivery into barges at the quays.

Tenders, endorsed "Tender for Coal," must be sent, addressed to James Guthrie, Esq., Town-Clerk, on or before the 2nd of July.

By order of the Committee,
JAMES STELFOX, Manager.

MAIDSTONE GAS COMPANY.

TO CONTRACTORS AND BUILDERS.
CONTRACT No. 1.

THE Directors of the above Company invite TENDERS for the building of a RETORT-HOUSE, 150 ft. long, 68 ft. wide, and 26 ft. high; also Two COAL STORES, 150 ft. long, 40 ft. wide, and 16 ft. high.

Drawings and specification and form of tender can be seen at the Gas-Works, Maidstone, on and after Tuesday, the 12th inst., and further particulars obtained from Mr. John West, the Company's Engineer.

Sealed tenders to be sent in on or before Wednesday, the 20th inst., addressed to the Chairman of the Company, Gas-Works, Maidstone, and endorsed "Tender for Retort-House and Coal Stores."

The Directors do not bind themselves to accept the lowest or any tender.

By order,
BEALE AND HOAR, Clerks.

Maidstone, June 5, 1877.

MAIDSTONE GAS COMPANY.

TO ENGINEERS AND CONTRACTORS.
CONTRACT No. 2.

THE Directors of the above Company invite TENDERS for the supply and erection of a Wrought-Iron ROOF for a new Retort-House, 150 feet long and 68 feet wide.

Drawings and specification, and form of tender, can be seen at the Gas-Works, Maidstone, on and after Tuesday, the 12th inst., and further particulars obtained from Mr. John West, the Company's Engineer.

Sealed tenders to be sent in on or before Wednesday, the 20th inst., addressed to the Chairman of the Company, Gas-Works, Maidstone, and endorsed "Tender for Wrought-Iron Roof."

The Directors do not bind themselves to accept the lowest or any tender.

By order,
BEALE AND HOAR, Clerks.

Maidstone, June 5, 1877.

IMPORTANT SALE OF SHARES

In the Woolwich Equitable Gas Company, the Woolwich Consumers Gas Company, and the Clacton-on-Sea Gas and Water Company, Limited, by direction of the Executors of the late Mr. John Webber.

MR. H. H. CHURCH is instructed to SELL by PUBLIC AUCTION, at the Masonic Hall, William Street, Woolwich, on Thursday, June 28, 1877, at Four for Five o'clock in the Afternoon, Seventy-six £10 ORIGINAL SHARES, fully paid up, in the Woolwich Equitable Gas Company, and paying an annual dividend of £10 per cent. Thirty-eight £10 ADDITIONAL SHARES in the same Company, whereon £2 per share have been paid, paying an annual dividend of £7½ per cent. Thirty £5 SHARES, third issue, fully paid up, in the Woolwich Consumers Gas Company, paying an annual dividend of £7½ per cent. Five £5 NEW SHARES in the same Company, fully paid up, and paying a dividend of £7½ per cent. per annum; also Twenty £5 B SHARES, all paid up, in the Clacton-on-Sea Gas and Water Company, Limited.

Particulars and Conditions of Sale may be had of Messrs. FARNFIELD AND SAMPSON, Solicitors, 19 and 21, Queen Victoria Street, LONDON, and Parson's Hill, Woolwich, and of the AUCTIONEER, William Street, WOOLWICH.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent Gas-Washer is an excellent cleanser of gas from tar, ammonia, sulphur, and carbonic acid, reducing the cost of subsequent purification 30 to 50 per cent. Needs no motive power or attention beyond drawing off and recharging as required. Has no moving parts or complications to get out of order. Is of moderate cost, and is practically indestructible.

Application to be made to the MANUFACTURERS, the Horseley Company, Tipton, STAFFORDSHIRE.

PATRONIZED BY THE ROYAL ARSENAL, WOOLWICH.

FERGUSON, Builder and Contractor. Kite method of Repairing Church Spires and High Chimneys. Chimneys straightened, pointed, and hooped. Old Chimneys pulled down by a process requiring no scaffolding or stoppage of work, by competent workmen, under personal supervision. For Lightning Conductors—cheapness and method of fixing—apply to C. R. FERGUSON, 16, Canal Road, MILE END.

HENRY LYON,
ENGINEER,
AND
CONSULTING GAS ENGINEER,
BARTON HOUSE, opposite BARTON ARCADE,
DEANSGATE, MANCHESTER.

ALFRED LASS,
SPECIAL ACCOUNTANT FOR GAS COMPANIES,
30, GRACECHURCH STREET, LONDON.

Accounts analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.
The Forms of Account, which have been specially designed by A. L. to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.
The above forms are registered.
Water Companies Accounts also prepared and adjusted.
CONSULTATIONS.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
SCOTSWOOD-ON-TYNE.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of
CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS

BOUCK & CO., LIMITED,
TAR DISTILLERS & MANUFACTURING CHEMISTS,
MILES PLATTING, MANCHESTER.

BUYERS OF COAL TAR,
And Crude Products therefrom,
AMMONIACAL LIQUOR, &c.

W. HAILES,
FURNACE BUILDER AND RETORT-SETTER,
Contracts for the
BUILDING AND SETTING OF RETORT BENCHES,
In large or small works, at home or abroad;
Also to supply all kinds of
FIRE GOODS AND IRONWORK
Necessary for the Erection of Retort-Beds.
The greatest amount of heat by the smallest possible amount of fuel is the principle of the settings.
ADDRESS:
No. 3, High Street, Brentford, MIDDLESEX.

YEO'S PATENT ENGINE PACKING AND IMPROVED YARN FOR GAS AND WATER PIPE JOINTS.
EPHRAIM YEO, Inventor, Patentee, and Sole Manufacturer of the Patent Excelsior Self-Lubricating Rope Engine Packing, price 1s. 8d. per lb., any size. Carriage paid on ¼ cwt. and upwards to any Railway Station in the Kingdom. Best Tarred Spun-Yarn for Gas-Pipe Joints, 28s. per cwt. Best White Ditto, any size, 36s. per cwt. Best Ditto, boiled in Oil and Tallow, 36s. per cwt. Coke Sacks, any length or width, Tarred or Untarred. Carriage paid to any Railway Station in the Kingdom. Address—
E. YEO, NEWTON ABBOT, DEVONSHIRE.

JOHN ROMANS, C.E., F.G.S.E.,
CONSULTING GAS ENGINEER
AND
CANNEL COAL FACTOR.
30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.
GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14¼-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

THE TYNE COAL COMPANY, LIMITED, OWNERS.
W. RICHARDSON, Fitter,
29, QUAYSIDE, NEWCASTLE-ON-TYNE.

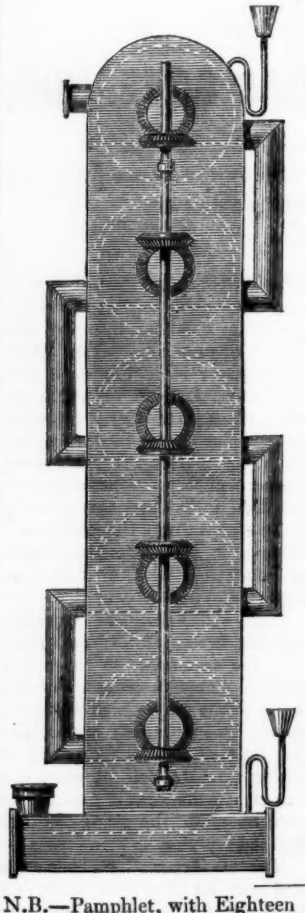
THE THAMES BANK IRON COMPANY,
(Successors to LYNCH WHITE,)
SUPPLY FROM STOCK
CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.
All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.
ADDRESS—
OLD BARGE WHARF, UPPER GROUND STREET, LONDON, S.E.

GAS PURIFICATION.
BAILES & HALLSWORTH,
CONTRACTORS FOR THE
PURIFICATION OF COAL GAS,
BY THEIR
PATENT OXIDE OF IRON COMPOUND.

The material is in use at most of the principal Gas-Works in Yorkshire and elsewhere. It contains considerably less moisture than natural Oxide of Iron. It is much cheaper and more efficient as a purifying agent.
B. & H. are purchasers of Spent Oxide, or will take Spent in exchange for New Material.
FOR SAMPLES AND TERMS, ADDRESS—
BAILES & HALLSWORTH, COPPERAS WORKS, ARMLEY, LEEDS.

GEORGE ANDERSON,
GAS AND CONSULTING ENGINEER,
35A, GREAT GEORGE STREET,
WESTMINSTER, S.W.

ANDERSON'S
PATENT
COMBINED WASHER AND SCRUBBER.



TESTIMONY OF ITS ACTION.

The Gas-Works, St. Albans,
April 27, 1877.

DEAR SIR,

Your Brush Scrubber has been in action here for four months.

It removes the whole of the ammonia from the gas, so that it will not discolour moistened turmeric paper.

The brushes cause no appreciable increase of pressure, and there is no repumping of liquor. Clear water run in at top, issues from the bottom fit to proceed to the sulphate-house.

It performs its work more efficiently than the tower scrubber I have, while only about half the height, and not one-fourth its weight or capacity.

My purifiers also last much longer before they are foul than they did previously.

I am, yours truly,
A. F. PHILLIPS.

G. Anderson, Esq.,
35*a*, Great George Street, S.W.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

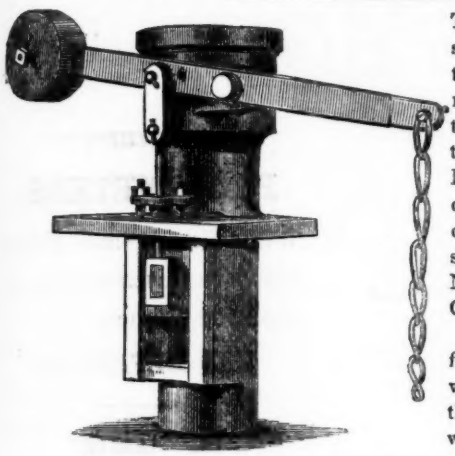
JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

MOORE'S PATENT DIP-PIPE.



THE advantages of this Dip will be seen from the engraving. It is thoroughly effectual in its working, removing the whole of the pressure of the hydraulic main from the retort, thus causing a great saving in gas. It is very easy of manipulation, requiring little care and attention; it cannot get out of order, and, when shut, works as an ordinary Dip-Pipe. No accumulation of carbon in retort. Can be fixed to existing H-pipes.

In ordering the Dip, the distance from top side of hydraulic main to water-level should be stated; also the Dip at which it is required to work when the valve is shut.

PRICES—3-in., 35s.; 4-in., 42s.; 5-in., 48s.

SOLE AGENT: J. GILL, GAS-WORKS, BRIDGENORTH,

To whom all communications should be addressed.

MAKERS: THE COALBROOKDALE COMPANY, SHROPSHIRE.

S. OWENS & CO.,

WHITEFRIARS STREET, LONDON, E.C.,

HYDRAULIC ENGINEERS,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT STEAM-PUMPS,

More than 10,000 in use,

ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.

The following are some of the prominent advantages of the BLAKE PUMP:—

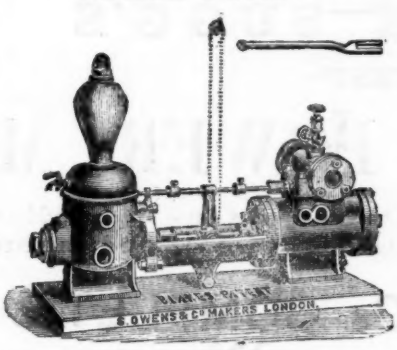
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

It is made of best materials in the most workmanlike manner.

Can be worked at 20 strokes per hour, or 200 strokes per minute.

This Illustration represents Boiler-Feed Pumps, Sizes Nos. 1, 2, and 3, with Hand Lever for working Pump when Steam is not available.

SOLE MANUFACTURERS OF

MANN & OWENS
IMPROVED PATENT GAS-VALVES.

PRICED LISTS AND FULL PARTICULARS FURNISHED ON APPLICATION.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

CLOTH GAS-BAGS FOR MAINS,

As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber, and Gutta-Percha Machine-Bands, Sheet and Washers, and Steam Joints.

T. BUGDEN, Manufacturer,

79, GOSWELL ROAD, LONDON, E.C.

GRIRDROD'S PATENT PORTABLE PIPE SCREWING MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers,

ALBION WORKS, SALFORD, LANCASHIRE.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:

DARTMOUTH & BRIXHAM (TORBAY) DEVON.

OFFICES:

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SOLE PROPRIETORS AND MANUFACTURERS OF

WOLSTON'S CELEBRATED

TORBAY IRON PAINTS.

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are *free* from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

READY-MIXED PAINTS.

A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT STREET,

WESTMINSTER, S.W.

"EVANS"

PHOTOMETERS,

Which DO NOT REQUIRE A DARK ROOM, with Fittings and Bench complete, as approved by the

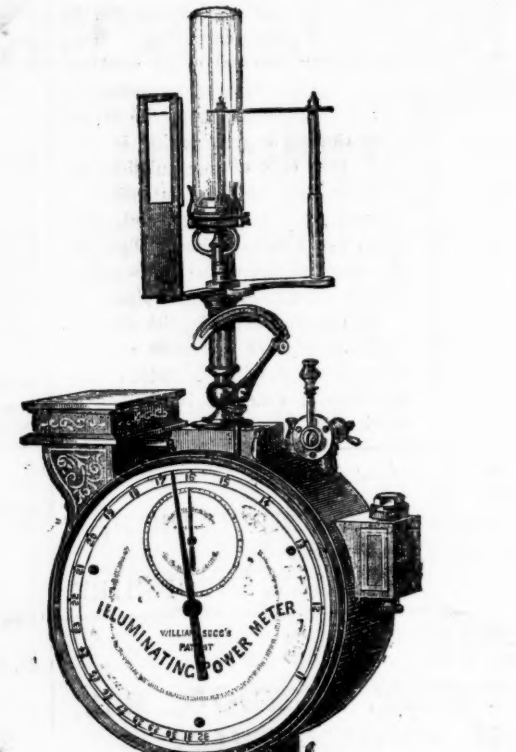
GAS REFEREES.

LOWE'S

Jet Photometers

(KIRKHAM & SUGG'S IMPROVED),

With all the most recent additions.



"LETHEBY"

PHOTOMETERS,

With Fittings and Bench complete for DARK ROOM, as approved by the

GAS REFEREES.

THE "LONDON"

Standard Burner,

"GAS REFEREES MODEL,"

For 14 and 16 candle Gas.

"GAS REFEREES"

PRESSURE-GAUGES.

"GAS REFEREES"

SULPHUR & AMMONIA

TESTS,

With all the accessories.

WILLIAM SUGG'S

PATENT

ILLUMINATING POWER METER,

For showing the Illuminating Power of Gas in Parliamentary Sperm Candles, by the observation of one minute.

PRICE £26 10s. COMPLETE.

The above Meter is now in use in London and several large towns in England, Scotland, and Ireland; also in America and Australia. The results, as reported to the present time, have given great satisfaction.

Price Lists and further Information on application to above Address.

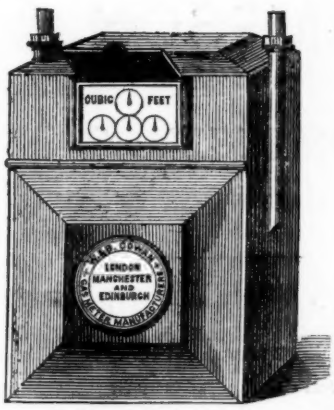
W. & B. COWAN,

ORIGINAL LICENSEES AND MANUFACTURERS OF

WARNER & COWAN'S SELF-REGULATING GAS-METER.

(THE ONLY METER SUITABLE FOR TROPICAL CLIMATES.)

DRY METERS.



1 to 100 Lights, inclusive.

150 Lights and upwards.

All our Dry Meters (of every size) are made of tin plates, whereas most makers make their larger sizes of another material, which is difficult to solder in a satisfactory way, and often cracks at edges in folding. The tin plates are stronger and heavier than those used, so far as we know, by any other firm.

The index wheels are arranged to give more than the usual space in the valve-box, which is of great advantage when valves have to be reground or cleaned.

The diaphragms are tied with tinned wire instead of cord, which latter cannot be so tightly drawn as wire, and, as sometimes happens afterwards, becomes loose, with the result that the leathers become detached from the rims of the diaphragm.

In addition to the ordinary central stuffing-box, there is a grease-cup fixed on the valve crank-shaft, into which the stuffing-box dips.

This arrangement is a valuable addition to the Meter, and materially tends to prevent leakage. In the larger sizes similar grease-cups are fixed on the flag wires, the stuffing-boxes of which dip into them in the same way, and with the same excellent result.

W. & B. COWAN,

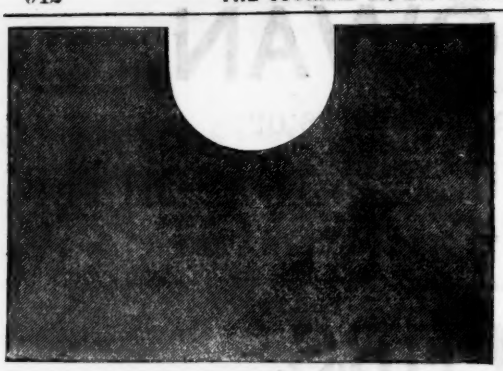
WET & DRY GAS-METER MANUFACTURERS,

(ESTABLISHED 1827.)

CHURCH STREET,
MILLBANK STREET,
LONDON, S.W.

FENNEL STREET,
MANCHESTER.

BUCCLEUCH ST. WORKS,
EDINBURGH.



SOLID WOOD TROUGHING

FOR LEAD SERVICES,

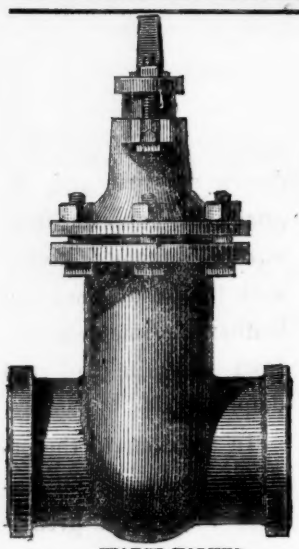
GROOVED AND CREOSOTED.

Made to any Section and Length.

THOMAS PROUD,

BROOKFIELD WORKS,

103, ICKNIELD STREET EAST, BIRMINGHAM.



WATER-VALVES.
All Sizes, Flange and Socket, kept in Stock, tested to 1000 feethead.

SIMPSON & COMPANY,

ENGINE-WORKS,

GROSVENOR ROAD, PIMLICO,

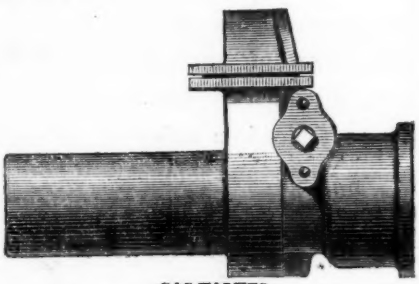
LONDON.

SCREW-COCKS, HYDRANTS,

SLUICES, PENSTOCKS,

And all other Machinery for

WORKS OF WATER SUPPLY, DRAINAGE AND IRRIGATION.



GAS-VALVES.
All Sizes, Flange and Socket, kept in Stock, tested to 100 feet head.

JOHN ABBOT AND CO.,

LIMITED,

IRON AND BRASS FOUNDERS,

PARK WORKS, GATESHEAD-ON-TYNE.

London Office: 2, SUFFOLK LANE, CANNON STREET.

Glasgow Office: 54, ST. ENOCH'S SQUARE.

MANUFACTURERS OF ALL DESCRIPTIONS OF

HYDRAULIC MACHINERY,

INCLUDING

ACCUMULATORS, FORCE-PUMPS, CRANES, & LIFTS,

FOR

GAS-WORKS, WAREHOUSES, &c.

IMPROVED HYDRAULIC MACHINERY,

Specially Arranged for Lifting and Lowering Purifier-Covers, &c.

MAKERS OF

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS;

PIPES FOR GAS AND WATER WORKS;

ROOFS, COLUMNS, AND GIRDERS.

DESIGNS AND ESTIMATES SUPPLIED ON APPLICATION.

THE WIGAN COAL & IRON COMPANY,
LIMITED.

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN;

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

GAS PURIFICATION & CHEMICAL Co., LIMITED,
(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON, } Joint Managing Directors.

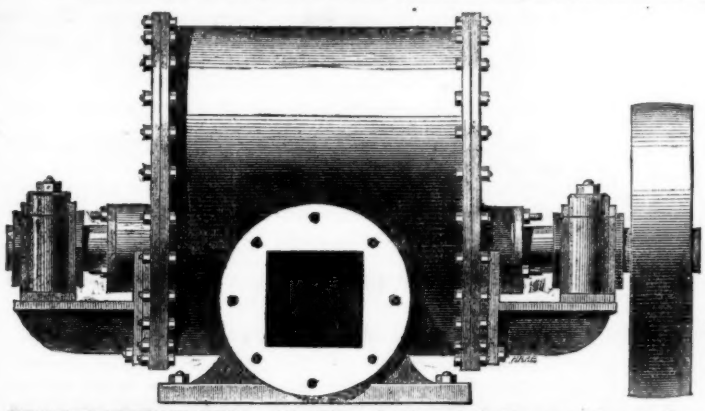
GEORGE WALLER & CO.,
GAS ENGINEERS AND CONTRACTORS,
MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,
COMBINED ENGINES AND EXHAUSTERS,

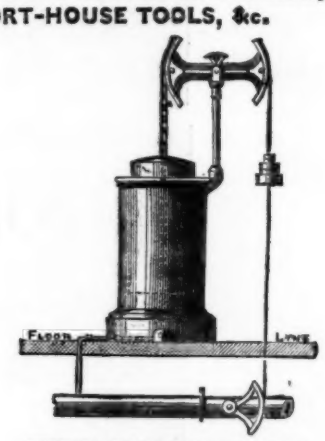
IMPROVED HYDRAULIC REGULATORS, TAR AND LIQUOR PUMPS,

SCRUBBERS, PURIFIERS AND CONDENSERS, HYDRAULIC AND STEAM LIFTS FOR COAL AND OXIDE,

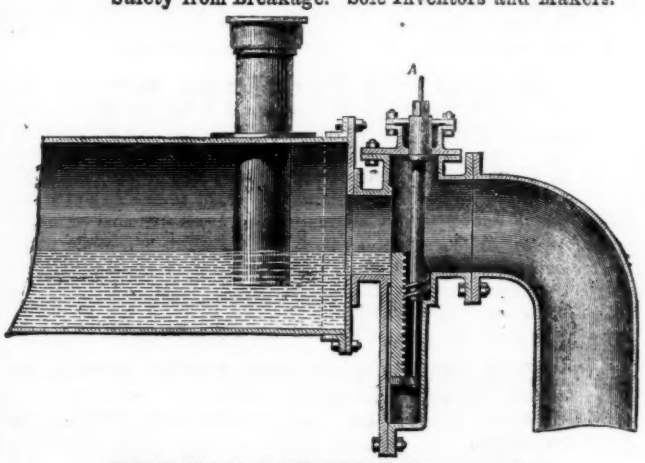
BOILERS, ROOFS, COLUMNS, GIRDERS, PURIFIER TRAVELLERS, RETORT-HOUSE TOOLS, &c.



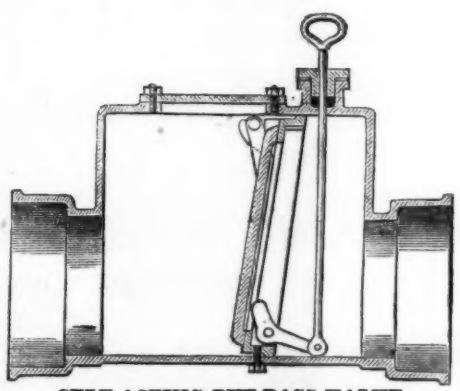
BEALE'S EXHAUSTER, with Wrought-Iron Spindle, ensuring perfect Safety from Breakage. Sole Inventors and Makers.



HYDRAULIC REGULATOR.



HYDRAULIC MAIN VALVE for Regulating Seal of Dip-Pipes.



SELF-ACTING BYE-PASS VALVE, with Relieving Lever.

EXHAUSTERS, VALVES, PUMPS, ENGINES, &c., ALWAYS KEPT IN STOCK.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, SOUTHWARK, S.E.;
AND AT
STROUD, GLOUCESTERSHIRE.

C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

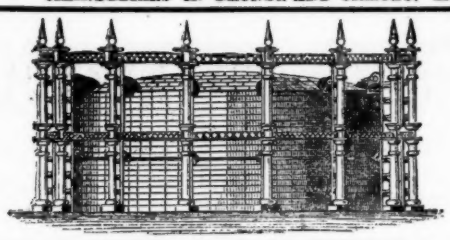
MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

LESMAHAGOW CANNEL COAL.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

SOLE AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL.

Quotation and Analysis forwarded on application.

G. J. EVESON,

GAS COAL AND CANNEL FACTOR,

Has on offer, in quantities to suit purchasers, Best Wigan Arley Mine, Orrell Screened and Unscreened Gas Coal and Nuts; Best Yorkshire, Real Old Silkstone, Derbyshire, and North Staffordshire Screened and Unscreened Gas Coal and Nuts; also Best Lancashire, Yorkshire, Derbyshire, and other Cannel, as supplied to some of the principal Gas Companies in England, to whom references are permitted.

Analysis and Prices forwarded on application to

HEAD OFFICES, STOURBRIDGE.

N.B.—Gas Managers will oblige by advising when they will be prepared to receive Tenders.

STOURBRIDGE FIRE-BRICKS, RETORTS, CLAY, &c.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

173, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

LOTHIAN'S CANNEL

Yields 13,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,330 cubic feet of 32·5-candle gas per ton.

Prices and full Analyses on application.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

THOMAS LAMBERT & SONS

MANUFACTURE EVERY DESCRIPTION OF

GAS AND WATER FITTINGS;

ALSO,

WROUGHT-IRON TUBES & FITTINGS.

SHORT STREET, LAMBETH, LONDON.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

ALBERT GAS COAL.

THE DERBYSHIRE

SILKSTONE COAL COMPANY,

LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered in trucks at any Railway Station in England, or shipped on board at Hull, Grimsby Docks, or Barrow-in-Furness.

Purified gas per ton of coal in cubic feet (average)	**10,262**
Illuminating power in candles	**15·86**
Weight of coke in lbs. per ton of coal	**1,502**

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON, Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

THE

WIGAN & WHISTON COAL COMPANY,

LIMITED,

(COLLIERIES—PRESCOT, NEAR LIVERPOOL)

Are now prepared to supply their

RUSHY PARK GAS COAL,

Either to Gas-Works in England or Wales, or for Shipment, at Runcorn, Garston, Birkenhead, or Liverpool.

This Coal is of superior quality, and yields in practical working over 10,000 cubic feet of Purified Gas per ton, with an Illuminating Power of 17½ candles.

One Ton of Coal yields 1441 lbs. of good Coke.

For prices, &c., apply either direct to the Colliery or to the Company's Office,

195, FALKNER STREET, LIVERPOOL.

SILKSTONE GAS COAL

AND

LANCASHIRE AND MIDLAND CANNEL.

EMOR G. WRIGLEY, Merchant,

Having made arrangements with four large Collieries for the exclusive sale of their GAS COAL and CANNEL, can offer to Gas Companies large quantities, for delivery over one or two years, at exceedingly low prices. His REAL OLD SILKSTONE GAS COAL will give, in regular work, 10,200 feet 16·6 candle gas and 13 cwt. superior coke; and a WIGAN CANNEL 11,375 feet 21·75 candle gas and 12 cwt. superior coke.

PRICES AND ANALYSIS WILL BE FORWARDED TO ANY PART ON APPLICATION TO THE CHIEF OFFICE,

120a, STAMFORD STREET, ASHTON-UNDER-LYNE.

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.

This Paint having been in general use over fifteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.

NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

The various descriptions of Gas Coal produced from the above Collieries possess an unequalled reputation, combining in a large degree the constituents essential for the production of the best quality of Coke and Gas of a high illuminating power.

A recent extensive development of the Collieries enables us to offer increased supplies.

JAS. PATERSON, Esq., of Warrington, after testing various qualities of our Coal, has sent the following testimony of their merits:—

Warrington Gaslight and Coke Company,
Offices, Mersey Street, Warrington, April 23, 1877.

Messrs. NEWTON, CHAMBERS, AND CO.,

Gentlemen,

After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

The average of Nine samples gives a yield of 12,500 cubic feet of 15½ Candle Gas, being equivalent to 664 lbs. of sperm per ton, and 1420 lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

Yours truly,

JAMES PATERSON.

Full particulars will be sent on application to us—address as above.

NEW PATENT WET GAS-METER,

THE "RELIANCE,"

MANUFACTURED BY THE

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON; UNION STREET, OLDHAM; HANOVER STREET, DUBLIN.

The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

Accuracy is obtained by subjecting the whole of the water which determines the measuring chambers of the drum to one uniform even pressure, and so prevents unequal displacements of the water-line.

The "RELIANCE" METER has been tested by several of the most experienced official meter inspectors. Copies of their reports may be obtained on application to the

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON.

ALEXANDER WRIGHT & CO.,

55, 55a, & 56, MILLBANK STREET, WESTMINSTER,

LONDON, S.W.,

WET AND DRY GAS-METER AND GAS APPARATUS MANUFACTURERS.

In the Press, and will be shortly Published,

AMMONIA LIQUOR TESTS.

BY

F. W. HARTLEY, A. Inst. C.E., &c.

The strength and therefore the commercial value of Gas Liquor has heretofore been determined by tests of very uncertain character—unsatisfactory alike to the vendors and buyers of this product.

In the above-named little Work will be found clear explanations of the usual methods by which the strength of Liquor is ascertained, an exposition of the imperfections of those methods, together with instructions for testing on an improved system, by which the total quantity of Ammonia in Gas Liquor may be determined with facility.

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW.

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges,

Governors, Test Holders, &c., &c.

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Established

1795.

JOSEPH CLIFF & SONS,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

London Wharf: No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL: Back Leeds Street.

SPECIAL NOTICE.—Our Patent Machine-made Retorts have now been in *actual work* nearly 800 days, and are yet in good order. References on application.

London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co. 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, June 12, 1877.